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American
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VOL. 33 AUGUST, 1947 No. 8

Original Articles

PRESIDENT'S ADDRESS

NORTHEASTERN SOCIETY OF ORTHODONTISTS

GLENN H. WHITSON, D.D.S., BROOKLYN, N. Y.

THIS Society, founded in 1921, has just rounded out its first quarter-century. We owe an eternal debt of gratitude to the eight founding fathers who built so well and with such vision that our society is now the largest constituent of the American Association of Orthodontists.

The past year has marked the transition from war to peace. As recent as June of 1946, fourteen of our members were still listed on the Honor Roll of active members who were serving in the Armed Forces. We salute these brave men who, without thought of personal sacrifice went forth to do their share in accomplishing the final victory.

The attendance at the November, 1946, meeting was the largest in the entire history of this Society and strained to the utmost the physical capacity of the meeting hall and the luncheon room. This present session is equally well attended. Such an enthusiastic response by so many orthodontists and men interested in orthodontics can only be due to the exceptional programs arranged by our competent Executive Committee.

In accordance with the bylaws of this Society, it is now my duty to give an accounting of the past year and to make those recommendations which may assist in the smooth functioning of our organization.

The first of my recommendations pertains to the proposed change in the method of electing the officers of the American Association of Orthodontists.

Presented at the meeting of the Northeastern Society of Orthodontists, New York, N. Y., March 10 and 11, 1947.

This change should be given very serious consideration. For many years balloting has been done by mail. The Secretary of the American Association of Orthodontists reports that this method has been satisfactory to the members generally and that it does not entail too much additional work. It gives every member in good standing an opportunity to vote. At the last election, some 585 members voted. As the membership at that time was 735, approximately 80 per cent cast individual ballots by mail.

The proposed change would do away with this mail ballot, the election being held at one of the executive sessions during the annual meeting. Thus, only members attending the executive session would be able to vote. Sometimes a quorum is not present at these meetings. Hence, it would be possible for one of the larger sections, when serving as host, by mere numerical preponderance, to dominate the vote.

I recommend that the Northeastern Society adopt a resolution opposing this change and instruct its Director to so report to the Board of Directors of the American Association of Orthodontists at the next annual meeting.

My second recommendation is submitted in the hope that an amicable understanding can be consummated between the Commission on Dental Journalism of the American College of Dentists and the American Association of Orthodontists. The background is as follows: In 1928, the American College of Dentists created the Commission on Dental Journalism with Dr. Bissel B. Palmer as chairman. His successor was Dr. J. Cannon Black of Chicago, recently deceased. The American College of Dentists, in its desire to improve dental journalism, established three classes of journals—Class A, professionally owned and controlled journals; Class B, professionally controlled but privately owned; Class C, privately controlled and privately owned.

Over a period of years the committee on journalism of the American College of Dentists (and we would assume with the knowledge and consent of the Board of Regents of the American College of Dentists) has continually attacked the American Association of Orthodontists for publishing their proceedings in a journal in which there was a lack of professional control, and they have criticized The C. V. Mosby Company for publishing a dental journal in which advertisements were accepted for products which did not meet with the approval of the Council on Dental Therapeutics of the American Dental Association.

The contract which has previously existed between The C. V. Mosby Company and the American Association of Orthodontists stated that the elected editors "shall be approved" by the publisher. That would indicate that the publication was or could be corporate controlled. That approval privilege, however, has never been practiced by The C. V. Mosby Company, and, consequently, as a matter of fact, the publication of the orthodontic section has actually been professionally controlled by the Board of Editors of the American Association of Orthodontists. In order that there could be no misunderstanding in this regard and so that the contract might conform with the actual practices which had existed, a new contract was drawn which deleted the power of the publisher of approval of elected editors.

In the January issue of the AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY, The C. V. Mosby Company announced that they had voluntarily established a new advertising policy in which they refuse to accept advertisements for any products which are not approved by the Council on Dental Therapeutics of the American Dental Association.

These facts indicate the desire of the American Association of Orthodontists and The C. V. Mosby Company to have the AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY in the highest ethical plane, which is approved by the dental profession. The orthodontic section of the JOURNAL certainly meets all of these qualities.

It is unfortunate that the American College of Dentists should have carried on their attacks on the orthodontic specialty in the methods which were used, for because of that there have been harsh words, antagonisms, and bitter feelings which are difficult to heal.

It is my understanding that certain standards of journalism are to be established by our national dental organization. That should be a forward step in the control of ethical dental publications.

It is the belief of your president, that The C. V. Mosby Company and the American Association of Orthodontists have been most fair and generous in establishing policies which indicate their desire for the highest type of journalistic ethics. They should be praised for their conscientious efforts to maintain an exceptionally high standard of journalism.

The New York Section of the American College has been active in its attempt and desire to commend these changes which have taken place and is anxious to have the American College of Dentists communicate with the American Association of Orthodontists and The C. V. Mosby Company to that effect.

It is my prediction that much will be done by the American College of Dentists in the near future to remedy the condition which has existed during the past years between the American Association of Orthodontists and the American College of Dentists.

If such is not the case, I then would recommend that our Director be instructed to review this matter before the Board of Directors of the American Association of Orthodontists. It is my hope that the American Association of Orthodontists would deem it wise to contact the Board of Regents of the American College of Dentists so that there will be no possibility of further detrimental or unjustified or questionable insinuations relative to the high standards of The C. V. Mosby Company or the ethics of the American Association of Orthodontists.

The next and also the last of these questions which I am bringing to your attention is that of our recognition of various orthodontic study groups. It is my understanding that the members of these particular groups are not specialists. Your officers and certain of the members of the Northeastern Society have been requested by some of those groups to appear before them and present certain phases of orthodontic procedures. I would like to recall to our

membership the fact that just seven years ago a standing resolution was placed upon our books, which read as follows:

> RESOLVED: That the New York Society of Orthodontists disapproves of the members of this Society participating in any capacity before an orthodontic society that is not recognized by the American Association of Orthodontists.
>
> Adopted March 11, 1940.

Some of our members are very unhappy about this resolution and for this reason this matter is again brought to your attention. However, in considering any change in this resolution, let us aim to maintain our high professional standards and ethics. We must be certain to continue to raise our ideals, our standards, and our professional requirements so that we will ever continue to advance. It has always been our desire that those who would be specialists should properly prepare themselves and present the necessary qualifications. There would then be no question but that they would be welcomed with open arms.

Before turning over the gavel to my successor I want you to know that I have considered it a great honor to serve as your president during the last year. I am deeply grateful for the outstanding cooperation of the members of the Executive Committee, Drs. Lowy, Callaway, and Donald Waugh. I also wish to thank the Advisory Committee composed of Drs. Young, Franklin, and Strang for their able assistance. Our hard-working Board of Censors certainly needs a word of encouragement and commendation, for it is overloaded with applications at the present time.

The Special Committees, with which most of you are not familiar, were as follows:

> Necrology, Drs. Waldron, Murless, and P. Hoffman
> Bylaws, Drs. Adams and Webster
> Postwar Planning and Public Relations, Drs. Salzmann, Thompson, and Erikson

In addition, those upon whom your president leaned most heavily were our able and energetic Secretary-Treasurer, Dr. Jacobson, and our ever-genial and efficient Executive Secretary, Mrs. Grimm.

CASE ANALYSIS AND TREATMENT PLANNING BASED UPON THE RELATIONSHIP OF THE TOOTH MATERIAL TO ITS SUPPORTING BONE

ASHLEY E. HOWES, D.D.S., NEW ROCHELLE, N. Y.

ONE of the most absorbing problems of present-day orthodontics is the relationship of tooth material to its supporting bone. Yet it is certainly not a new problem. In 1923, A. Lundstrom, who was so advanced in his orthodontic thinking, that nearly twenty-five years ago he referred to our specialty as "orthodontics" instead of "orthodontia," wrote an absorbing monograph entitled, "Malocclusion of the Teeth Regarded as a Problem in Connection With the Apical Base." The paper was a contradiction of the teachings of E. H. Angle, who believed that a full complement of teeth can and must be maintained in correcting any case of malocclusion. Angle also contended that after the coronal alignment of this full complement of teeth had been accomplished, through the stimulation of function, sufficient bone would be developed to support these teeth properly. Later, Angle himself found this was not always the case, so he recommended root-moving appliances to aid in this development. Lundstrom refuted Angle's contentions and believed that the form of the basal bone governed the positions of the teeth and, furthermore, that mechanical orthodontic therapy was unable to produce any growth in this basal bone or, as he termed it, "the apical base." Many of the earlier writers on orthodontics would undoubtedly have agreed with this thesis of Lundstrom's. Some of them had discussed the possibility of a combination of "small jaws" with "large teeth." The remedy was extraction. Angle's teachings very effectively turned the trend of orthodontics away from treatment by extraction, which shift was most beneficial to the profession, as it encouraged the members of that profession to more exacting efforts and also enabled them to see what could be done without extraction. Following twenty odd years of experimentation on the part of Angle's followers in trying to maintain a full complement of teeth in every or practically every case treated, Lundstrom's article should have helped to clear the atmosphere a lot more than it did, for it pointed out quite clearly that there were some dental irregularities which could not be permanently corrected when treated according to the teachings of Angle. It has remained for one of Angle's most observing and accomplished students, Dr. Charles Tweed, to contradict the teachings of his teacher and to bring the subject more emphatically to the attention of the profession. Tweed stressed the possibility of basal bone deficiency previously described by Lundstrom and advanced his own

Presented at the meeting of the Northeastern Society of Orthodontists, New York, N. Y., March 10 and 11, 1947.

theory concerning the proper angle of the mandibular incisors to the occlusal plane in normal occlusion. In order to obtain the verticality of the mandibular incisors, which he believed essential, Tweed found it necessary to extract premolars in a very large percentage of cases, and it was this recommendation of wholesale extraction that brought the profession to its feet from its complacent seat of semistagnation and made it realize that the whole subject of treatment possibilities must be thoroughly re-examined.

There have been many orthodontists and investigators who had realized for a long time that some dental irregularities cannot be permanently corrected unless one or more of the dental units is removed. One of these men was Dr. F. L. Stanton who, in my humble opinion, never received the credit which he deserved for the tremendous amount of time and energy which he expended in developing instruments for accurately measuring dental casts. Comparatively few men have paid much attention to some of the findings that these instruments recorded. For the benefit of some of the younger men, who may know only vaguely what these instruments were, I will say that the most useful one was a surveying instrument, embodying the principles of a pantograph, which is capable of very accurately projecting on to a single plane any and all points of interest of dental casts. The pantograph enlarged the distances between points five diameters as they were projected, so that the completed map of the denture, as it was termed, was five times as large as the surveyed cast. I believe this instrument and the one which was made later for Stanton by Bausch and Lomb for plotting the form of the denture in three dimensions have never been surpassed or even equaled for accuracy. There was also an instrument called an occlusograph for planning the curve of the arch necessary for a given amount of tooth material, if normal occlusion were to be achieved. Considerable controversy was aroused at the time the occlusograph was first described, but if it were to be introduced today, I am sure that anyone who uses any kind of guide, such as a Hawley chart, or marks off measurements on an edgewise arch, or even bothers to measure the amount of tooth material in a denture, would readily admit that it is a most ingenious method of determining the arch form for a given amount of tooth material. I mention this now because for many years I have been dependent on Stanton's instruments for measuring dental casts. Lundstrom, in his conclusions of the monograph previously referred to, states, "Since in an ontogenetic sense the occlusion is not able to control the apical base, while on the other hand the latter is in a high degree capable of affecting the occlusion, it is necessary, instead of regarding from a therapeutic point of view the anomalies of the positions of the teeth as simply or principally occlusional problems, henceforth to regard them as being in equal degree problems of the apical base, and the object of treatment will be the attainment of an occlusion (in harmony with the given or potential apical base) possessing a functional and hygienic optimum. From what has been observed above, it is clear that in a considerable number of cases, this optimum cannot be normal occlusion. The most urgent duty of mechanical orthodontics, therefore, is to endeavor to determine how in every case such an optimum is to be attained."

Lundstrom would find little antagonism to this statement today. Nearly every article on treatment contains some mention of the apical base, although it is referred to by other names, such as medullary bone, basal bone, subalveolar bone, and so forth, and many of our foremost teachers and writers admit that deficiencies in this bone sometimes exist, and when they exist, the bone cannot be restored to normal by orthodontic therapy. Brodie in his part of the "Extraction Panel" at the Chicago meeting has this to say, "It is our opinion that the extraction problem reduces itself to a consideration of just one question, viz.: Is there enough bone to hold the teeth in a normal and stable position following treatment? At present we have no accurate means of determining the relation between the mass of the tooth crowns and that of their supporting bone. Even granting the thesis that function will not increase the bone, we are still faced with the necessity for deciding the magnitude of disharmony which would justify the extraction of teeth. We do not feel that it is a sensible procedure to eliminate 13 to 14 mm. of tooth substance in an effort to gain 2 millimeters."

It is with the hope that some of the vagueness which surrounds the term "deficient basal bone" or "apical base" may be clarified that this presentation is made. This paper will not be concerned with etiology but with deficiency or distortion of the apical base as a fait accompli, as a condition which accompanies a large percentage of the dental irregularities which we are called upon to treat.

In my attempt to ascertain the principal quantitative differences between the supporting bone of normal dentures and of abnormal dentures, two methods of investigation were used. One was to take measurements in the mouth, which was quite simple but somewhat inaccurate. From these measurements, statistics were assembled. The other was to make orthographic projections of models of the teeth and the bone which supported the teeth. This was much more time consuming, but also of much greater interest. However, it has the disadvantage of not lending itself well to presentation, as the maps are hard to comprehend at a glance.

The maxillary apical base, with which this paper is chiefly concerned, is that part of the body of the maxillary from which the maxillary alveolar process has developed. If we should cut through the maxilla horizontally at the level of the apices of the teeth, we would cut off the alveolar process and expose this supporting base. Above the cut labially would be the outer wall of the nose, the outer wall of the antrum, the malar process, and the zygomatic surface of the maxilla. Lingually, in most cases the cut would be just above the palatal process of the maxilla. The cut would enter the antrum in most cases. This is the region I have tried to measure in the mouths and make surveys of from the models of patients. It is not always possible. The reason that more attention will be given to the apical base of the superior maxilla than to that of the mandible is that it seemed to me a greater factor in the production of malocclusion. The superior maxilla has been described as the key to the architecture of the face. I believe that the dental arches, both maxillary and mandibular, fall heir to almost any aberration suffered by the maxillary apical base.

The maxillary dental arch, occluding as it does outside the mandibular dental arch, and being fixed to the skull, holds the whip hand over the mandibular arch and governs its lateral development. Sometimes the mandibular arch escapes the influence of its dictatorial partner and develops in labioversion to it. Please do not get the impression that I am implying that we never have a

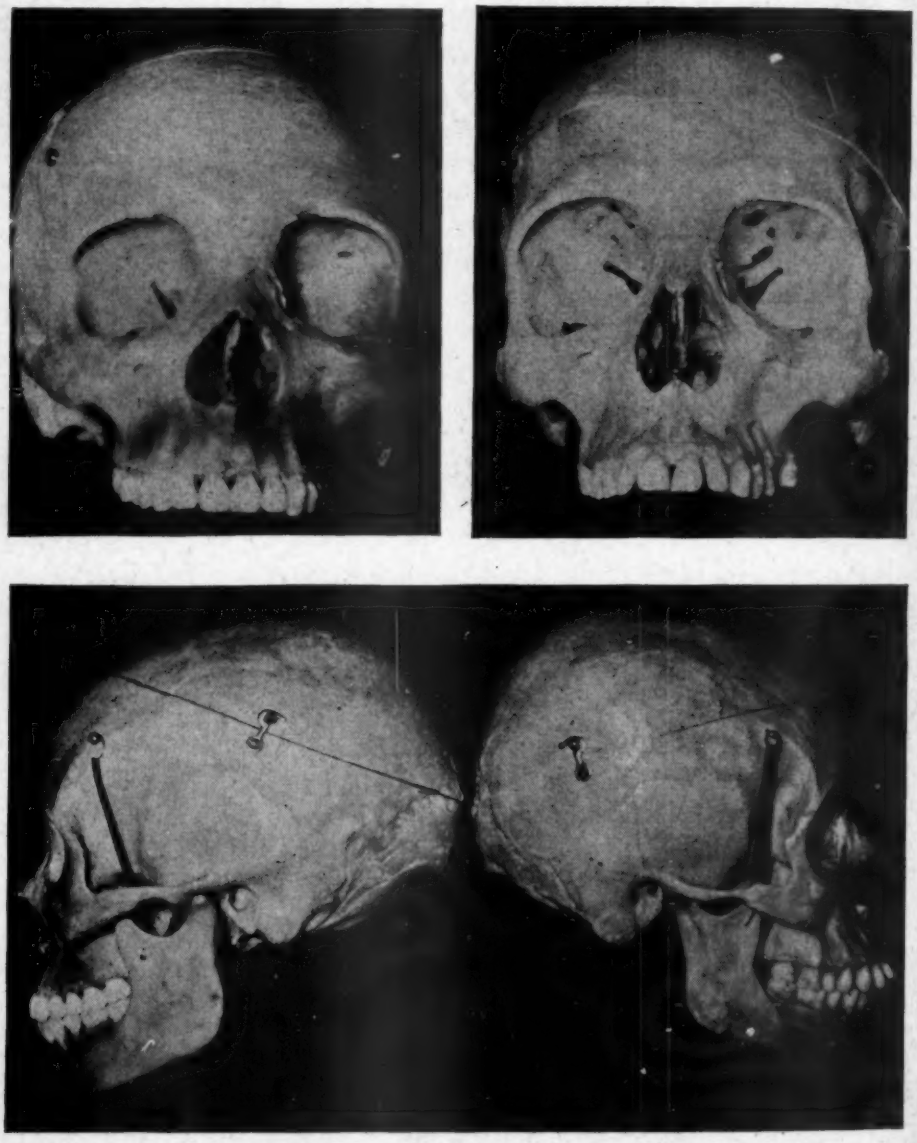

Fig. 1.—Prognathous skulls, the one on the left having a normal apical base, the one on the right having a slightly deficient apical base.

normal maxillary apical base and an underdeveloped mandible, because every orthodontist has seen the condition clinically. However, it is a subject which will not be covered in this paper because of lack of time and also because it has already been the subject of many radiographic cephalometric studies.

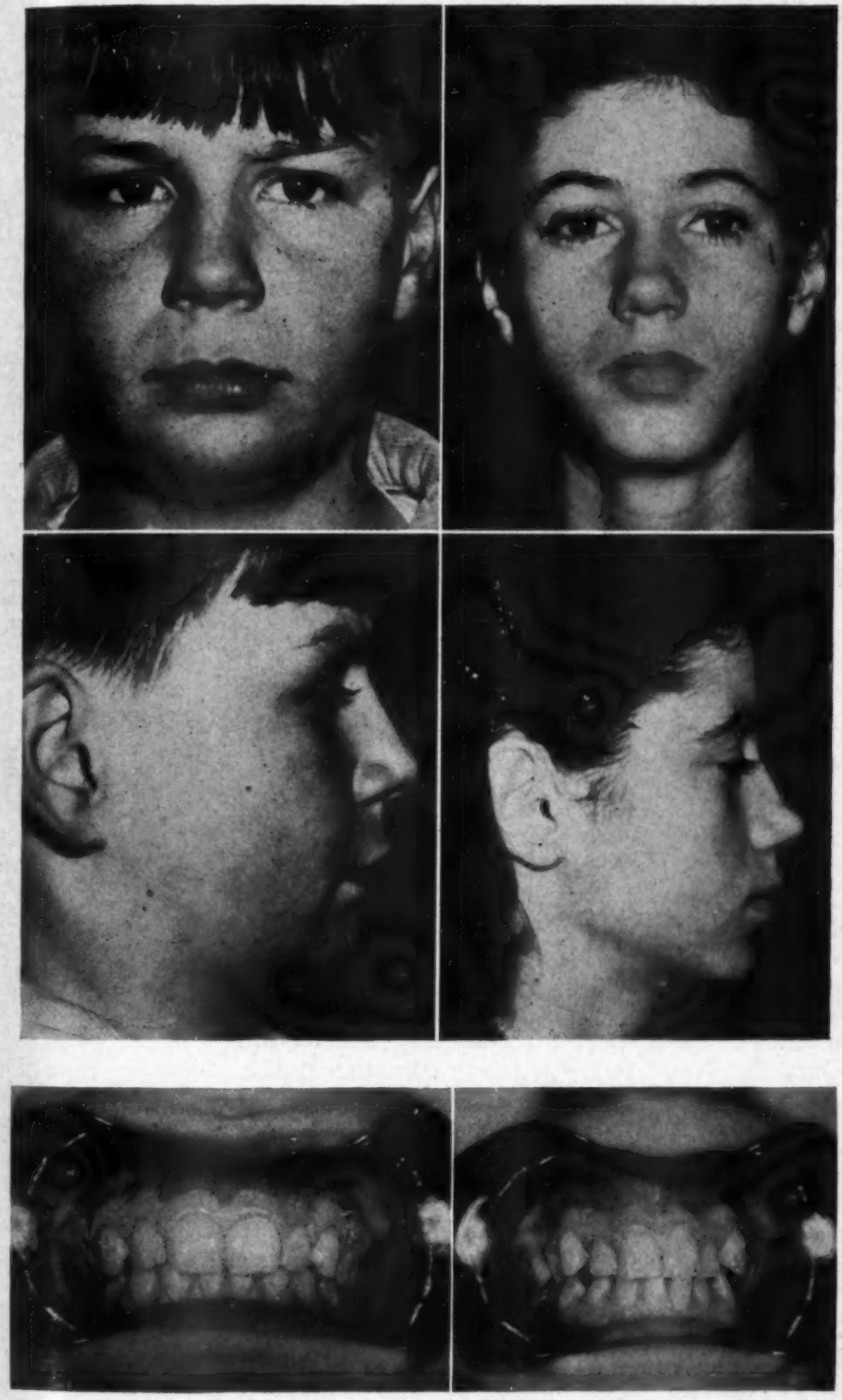

Fig. 2.—Normal apical base compared with deficient apical base.

Fig. 1 shows two skulls, both prognathous, one with a normal apical base and the other with a slightly distorted base. In the skull on the right there is some constriction of the apical base above the premolars, and the anterior walls of the maxillary sinuses sink inward. It is the belief of many men, and I am one of them, that this distortion of the base cannot be overcome by orthodontic manipulation of the alveolar process.

A comparison of a normal and a deficient base in the living subject can be seen in Fig. 2. The boy has a normal apical base, which accounts for the satisfactory orthodontic result. The bone above the maxillary teeth appears as a solid wall of bone, ridged by the underlying roots of the teeth. The canine fossa is really an optical illusion produced by the prominence of the canine root, rather than a sinking in of the bone over the premolars. The girl has a deficient apical base. Note the sunken appearance of the bone above the premolars and the exaggerated canine fossae.

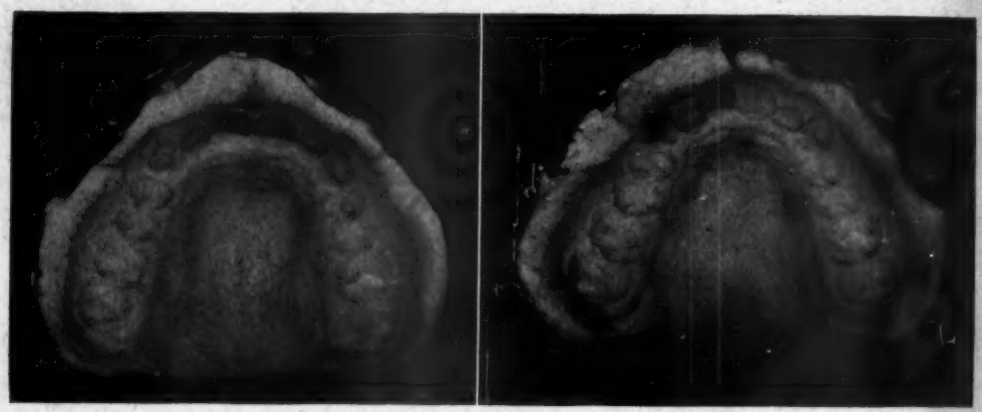

Fig. 3.—Comparison of maxillary impressions of two cases, one with a normal apical base and the other with a deficient apical base.

The upper impressions of the two children are shown in Fig. 3. I photographed the impressions to try to show how the teeth of the normal case all fall inside the peripheral rim of the impression, while in the other case this rim cuts across the first premolars. Through a peculiar lighting effect, the impressions look more like models. A glance at your impression in this premolar region and also distal to the molars, as Dr. Strang has previously pointed out, will give you some conception of how much of a deficiency exists. The line which I survey on the models and call the apical base line is the inner line of this peripheral rim.

The models in Fig. 4 show the outline of this peripheral rim. The center model is normal, the other two have deficient apical bases. The models are made by pouring the impressions only to the peripheral rim. The palatal portions of two of the models extended above the rim.

The models of the girl with the moderately deficient base (Fig. 3) are shown in Fig. 5. I have marked the lines which are surveyed. Of course, the teeth are surveyed also. In surveying the models, they are leveled on the occlusal plane, not the Frankfort plane. Accurate models with as much anatomy as

possible are essential. Inasmuch as, in taking an impression, the mucobuccal fold always turns our impression material outward, it was decided to survey as high up on the maxillary model as possible, but avoid the outward curve of the mucobuccal fold. In other words, I tried to get an outline of the supporting bone as nearly opposite the apices of the teeth as was possible. In this case, the impression has extended upward over the maxillary anterior teeth as high as the apices of the teeth. In some mouths it is possible to get the impression material nearly opposite the premolar apices also. It is rarely possible to get our impression material down to a line opposite the apices of the

Fig. 4.

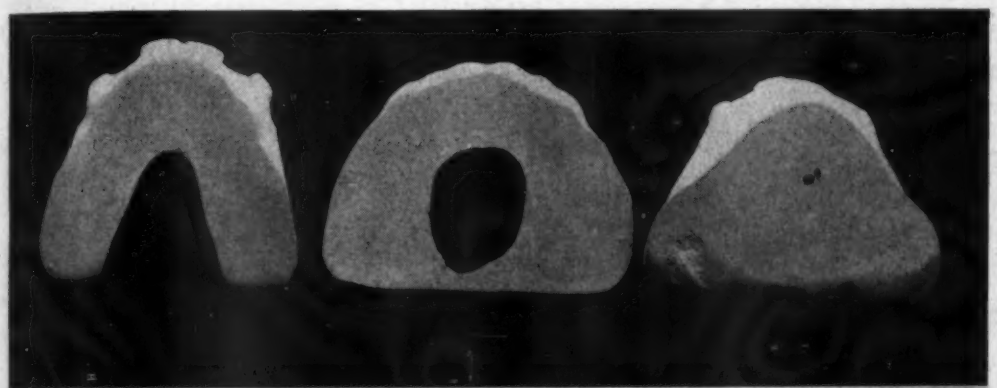

Fig. 5.

Fig. 4.—Inverted models showing comparison of normal apical base (center model) and two deficient bases.

Fig. 5.—Apical base line drawn on models.

mandibular teeth before that material is turned outward by the mucobuccal fold. The survey line of the supporting bone in the mandible, therefore, was as far down as possible, making sure it represented the bone and not soft tissue. We are trying to survey the bone outline in the region of the apices of the teeth. Lundstrom called this the apical base, a most descriptive term in my opinion. This is the region which Lundstrom and, more recently, other prominent investigators claim cannot be affected by mechanical orthodontic therapy. My own investigations, while inconclusive, would seem to agree with this contention.

Normal cases were surveyed first in order to ascertain the normal relationship between the teeth and their supporting bone. A normal case with its survey is shown in Fig. 6. The solid lines represent the maxillary teeth and the survey line of the supporting bone above them. The mandibular teeth are dotted. The maxillary and mandibular bone lines nearly superimpose. The maxillary base outline lies outside the molars, which is quite natural because they are below the malar processes. The bone outline moves inward as it goes forward from the first molars, but it still remains outside the cusps of the second premolars and, in most normal cases, such as this one, of the first premolars also. It cuts inside the cusps of the canines and the incisal edges of

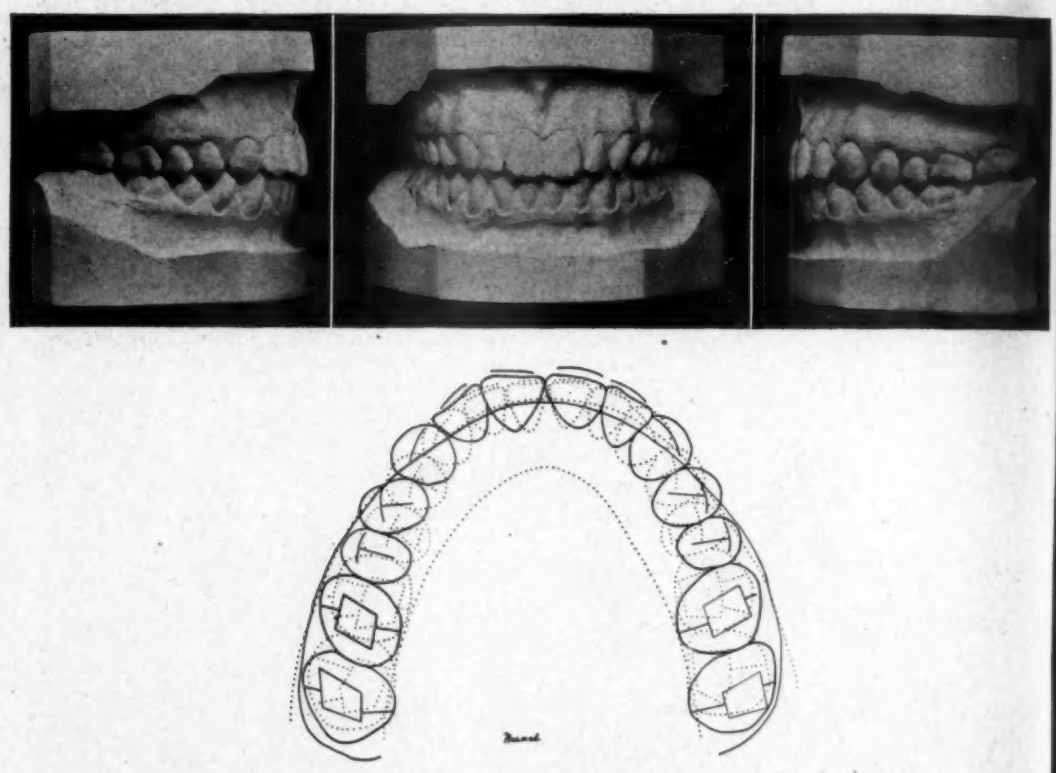

Fig. 6.—Models and survey of normal case. Heavy solid line is maxillary apical base line.

the four anterior teeth. The cusp patterns are represented, as previously described by Stanton. The dotted line lingually represents the mandibular bone at the lower border of the impression. Observe the symmetry of these lines. If this map is folded on its axis of symmetry, the two halves will superimpose almost exactly. When a map is folded in this manner, and the maxillary bone line of one-half falls directly over the maxillary bone line of the other half but the mandibular lines fail to coincide, I believe it indicates an eccentric position of the mandible, a subject merely mentioned in passing, but one of great importance. I try to keep a clear picture in my mind of this outline of normality when studying any case of malocclusion.

In Fig. 7 are the models and surveys of two maxillary arches, a deficient case compared with a normal case. Note that in the deficient case the constriction of the dental arch also exists in the apical base line. If we are going to try to maintain a full complement of teeth in this case, the teeth must be maintained within the basal outline in the premolar region, which would mean an exceptionally long, narrow arch. This is the guideline beyond which we cannot go in expanding the dental arch in the premolar region. The arch can be expanded in the molar region because the molars are under the malar processes, which extend laterally and so afford a base to support the molars after expansion.

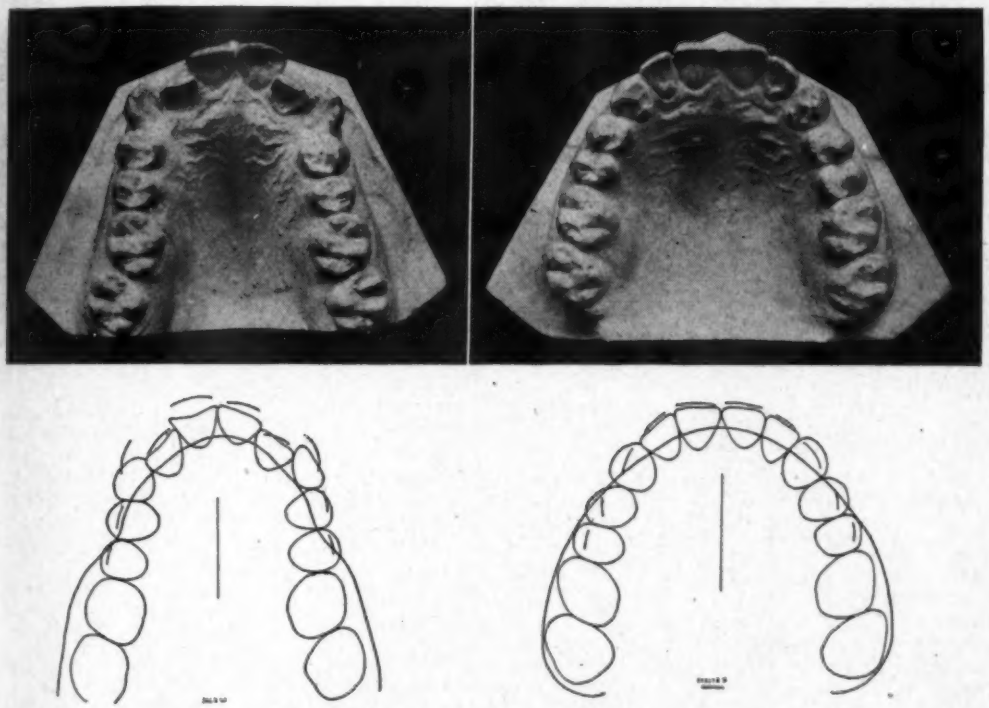

Fig. 7.—Comparison of normal and deficient apical base.

At this point, we must digress for a moment and speak about arch form because I want to emphasize the fact that we are not at liberty to arrange a set of teeth in a long, narrow arch form, regardless of its amount of tooth material. To prove this, an attempt was made to measure and survey as many normal dentures as possible. My records include only fourteen of such cases, but it seemed logical that I could also use some of the cases which I had treated, but which had required no expansion. In these normal cases it was found that a rather definite relationship with only a small amount of variation existed between the sum total of the mesiodistal diameters of all of the maxillary teeth anterior to the second molars and the width of the arch in the first premolar region. This relationship is shown in Fig. 8, which is a chart of the measurements of the fourteen normal untreated cases. On this chart in the first column is the sum of the mesiodistal diameters of the maxillary central and lateral

incisors and the cuspids. In the second column is the sum of the diameters of the first and second premolars and the first molars. Notice that the figures in the two columns show only slight differences. In other words, the sum of the mesiodistal diameters of the six anterior teeth and the sum of the mesiodistal diameters of the premolars and the first molars are nearly alike. In the third column is the sum of the two figures, that is, the total amount of maxillary tooth material, of the incisors, cuspids, premolars, and first molars. When I speak of maxillary tooth material, please remember that I am referring to these twelve teeth. It does not include the second and third molars. In the fourth column is the arch width in the first premolar region. This measurement is taken just inside the summits of the buccal cusps of the first premolars. The fifth column shows the percentage relationship of this premolar arch width to tooth material, and you will note in the fourteen cases listed, the lowest percentage is 42.5 per cent and the highest is 46.0 per cent, a variation of only 3.5 per cent. Now I do not know what this percentage relationship would be for various races, although this group does contain one Negro, whose percentage is 45.5 per cent, which is next to the highest of the group and indicates a very wide arch for the amount of tooth material. Granting that arches do vary in form, for practical purposes, I think we are quite safe in assuming that the first premolar width of every arch must be at least 43.0 per cent of its maxillary tooth material, not including the second and third molars.

NORMAL CASES	COMBINED WIDTH OF MAXILLARY INCISORS AND CUSPIDS	COMBINED WIDTH OF MAXILLARY PREMOLARS AND FIRST MOLARS	TOTAL TOOTH MATERIAL OF INCISORS, CUSPIDS, PREMOLARS, FIRST MOLARS	ARCH WIDTH AT FIRST PREMOLARS	PERCENTAGE RELATIONSHIP OF TOTAL TOOTH MATERIAL TO ARCH WIDTH AT FIRST PREMOLARS
Gloria R.	45.0	46.2	91.2	39.0	43.0
Arthur B.	49.4	47.6	97.0	43.0	44.0
Lucille S.	43.6	43.6	87.2	38.7	43.5
Norma A.	46.8	46.4	93.2	42.0	45.0
Evelyn K.	45.0	48.4	93.9	41.0	43.5
Paul S.	49.4	50.2	99.6	42.5	42.5
Ethel P..	45.5	46.8	92.3	39.2	42.5
Italian	47.4	49.4	96.8	44.6	46.0
Aged 49	45.9	46.6	92.5	39.5	42.7
Mrs. B.	44.6	48.4	93.0	40.6	43.6
Evelyn U.	48.2	49.8	97.0	42.3	43.6
Negro	47.8	48.4	96.2	43.8	45.5
Katie H.	44.6	46.8	91.4	41.1	44.8
Stanley K.	44.2	48.8	93.5	41.0	43.9

Fig. 8.

Returning to the measurements taken directly in the mouth, the one of greatest interest from a practical point of view was a caliper measurement taken above the apices of the maxillary first premolars recording the intercanine fossa width. (See Fig. 9.) For brevity's sake, I shall refer to this as the C. F. measurement. In a series of two hundred such measurements, it was found that there was a great variation in this region, the narrowest recording being 31.5 mm. and the widest being 50.5 mm., a difference of 19 millimeters. It was also found that this measurement was never smaller than the width of the maxillary

dental arch in this first premolar region unless the first premolars were tipped labially. In most instances these two measurements were the same. The premolar measurements were made from points just lingual to the summits of the buccal cusps. If the C. F. measurement were larger than the first premolar width, this seemed to indicate that the arch could afford to be expanded in the premolar region and, barring environmental influences which might cause relapse, there would at least be sufficient bone to support these teeth in their new positions. On the other hand, the premolar width of an arch expanded by appliances could never be maintained if it exceeded the canine fossa measurement. Now, if it is true that no arch can be wider in the premolar area than the width of the bone above the roots of those premolars, and if it is also true that orthodontic expansion of the arch cannot affect this region above the teeth, then, if there is a deficiency in this canine fossa region, we cannot hope

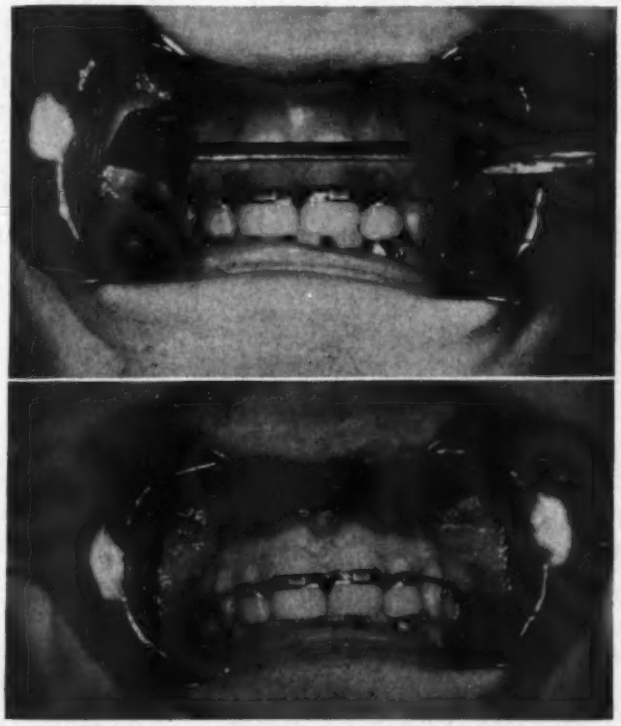

Fig. 9.—Taking caliper measurement of intercanine fossa (C. F.) width. Case has extremely small C. F. measurement in relation to its tooth material. Four premolars have been extracted.

ever to achieve normal occlusion. In such a case, we have three choices in planning our treatment. In some cases it may be wise not to treat at all and this, in my opinion, is not given enough consideration. Another choice is to gain as much expansion and distal movement of the posterior teeth as the apical base will allow and to accept the residual irregularity of the anterior teeth, which is certain to exist or sure to recur if overexpansion has been attempted. If the intercanine fossa width is deficient and will permit no expansion at all, then we may try to gain space for the anterior teeth, which must be either protruding, overlapping, or with one or more blocked out by over-

doing the distal movement of the maxillary posterior teeth. If intermaxillary force is used to accomplish this movement, the mandibular teeth, which are nearly always too far forward in relation to their supporting bone because of the constriction of the arch, will be worse than before treatment, and we will be achieving a cosmetic improvement of the maxillary anterior teeth at the expense of the position of the mandibular teeth. This is what Tweed calls trading in one type of malocclusion for another. If occipital anchorage is used to obtain this distal movement of the maxillary posterior teeth, these teeth will have to be moved beyond their proper fit with the mandibular teeth because there will be insufficient arch width. The third choice is to reduce the amount of tooth material by extraction.

PATIENTS	CANINE FOSSA	TOTAL TOOTH MATERIAL OF INCISORS, CUSPIDS, PREMOLARS, FIRST MOLARS	ARCH WIDTH AT FIRST PREMOLARS	PERCENTAGE RELATIONSHIP OF TOTAL TOOTH MATERIAL TO ARCH WIDTH AT FIRST PREMOLARS	PERCENTAGE RELATIONSHIP OF TOTAL TOOTH MATERIAL TO CANINE FOSSA
Helen W.	46.0	88.2	35.5	40.0	52.1
Larry L.	48.0	100.6	37.5	37.2	47.7
Peter G.	42.0	92.0	39.0	42.3	45.6
Billy R.	47.5	105.2	44.0	41.8	45.1
Herschel M.	47.5	106.8	47.0	44.0	44.4
Roberta G.	41.2	91.8	41.2	44.8	44.0
Dick S.	42.0	99.0	38.9	39.2	42.4
Judy M.	42.0	99.4	38.0	38.2	42.2
John B.	42.7	102.2	36.5	35.7	41.7
Camilla F.	38.0	93.6	33.0	35.0	40.5
Sally N.	39.0	96.2	39.7	41.2	40.5
Joan C.	34.0	85.6	34.0	39.7	39.7
Henry F.	38.0	96.6	39.3	41.6	38.1
Janet L.	39.0	104.2	36.8	34.0	37.4
Arthur S.	33.9	92.0	35.0	41.6	36.6
Richard R.	37.0	103.0	36.3	35.2	35.9
Mary G.	33.5	95.0	35.8	38.0	35.2
Barbara B.	39.0	112.2	37.0	33.0	34.7
Philip Z.	35.0	100.6	37.3	37.1	34.7
Jack W.	31.0	103.6	31.0	30.0	29.8

Of 125 cases measured, 42 per cent of them had a percentage relationship of 44 per cent or over. This was considered normal. Forty-two per cent had a percentage relationship ranging from 44 per cent to 37 per cent and 16 per cent had a percentage relationship of 37 per cent or under.

Fig. 10.

As stated before, the C. F. measurement was taken in two hundred cases, and these measurements varied from 31.5 mm. to 50.5 mm., a variation of 19 mm. or about 38 per cent. Of the two hundred cases measured, one hundred twenty-five of them were compared with their maxillary tooth material, not including their second and third molars. Fig. 10 shows the measurements of twenty of these one hundred twenty-five cases. I have selected cases showing a high or normal percentage relationship of intercanine fossa width to tooth material, cases showing moderate deficiency and cases showing extreme deficiency. You will remember that in a normal case, the apical base above the first premolars is always as wide or a little wider than the premolar arch width. Therefore, if the assumption that this premolar arch width must be at least

43.0 per cent of the maxillary tooth material is true, we may assume that the C. F. measurement must be slight greater, or at least 44.0 per cent of the maxillary tooth material, if it is to be considered normal. I have divided the cases analyzed into three groups. The first group is comprised of those cases having a normal relationship between intercanine fossa (C. F.) width and tooth material, that is, a percentage relationship of 44.0 per cent or more. The second group contained those cases having a percentage relationship of from 44.0 per cent to 37.0 per cent, and the third group contained those cases with a percentage relationship of 37.0 per cent or under. Of the one hundred twenty-five cases, fifty-two of them fell into Group I, another fifty-three fell into Group II, and twenty fell into Group III. In all but one case of this last group mentioned, two or four premolars were extracted as a preliminary step to orthodontic treatment. (This one case will be analyzed later.) Extractions were done in only three of the fifty-three cases which fell in the second group and no extractions were considered necessary in any of the fifty-two cases which fell in the first group. It is not being implied that extractions are never necessary in this group, because we are dealing here only with the intercanine fossa width, and not the anteroposterior dimensions of the apical base. There are cases which have a normal width of the apical base but insufficient length. In these cases, extraction of the upper second molars may be resorted to, or the maxillary first premolars can be removed and the cuspids, which are often blocked out, can be allowed to drop down and take their places, or it may even be necessary to extract four premolars. Group I of the one hundred twenty-five cases measured did not happen to contain any such cases, but an analysis of such a case will be made further along in this paper. The second group, in which I have resorted to extraction, as I said before, in only a few of the fifty-three cases, contains those cases which have produced so much controversy. The deficiency of basal bone is such that extraction of premolars creates too much space and treatment without extraction always ends in relapse. It, therefore, becomes a matter of personal choice to the individual orthodontist, and he will either decide to extract or not to, depending on whether he considers some irregularity of the incisors a greater abnormality than the abnormality which results from reducing the number of dental units and then eliminating the excess space created by moving all the posterior teeth well forward of their proper positions. There will be little controversy over whether or not the cases which fall in the third group can be successfully treated without resorting to extraction. I think most orthodontists will agree that if they are treated without extraction, the relapse which is bound to follow would be so extensive that reduction of tooth material is fully justified. There were other interesting and, in my opinion, significant indications brought out by these measurements. For instance, in the first group (with a C. F. percentage relationship of 44.0 per cent or over), the average actual C. F. measurement is 43 mm., while the average amount of tooth material is 92.1 millimeters. This is about the same as the 93.8 mm. average tooth material in the fourteen normal cases previously mentioned. In the third group (with a C. F. percentage relationship of 37.0 per cent or under), the average actual C. F. measurement is

34.7 mm., while the average amount of tooth material is 99.1 millimeters. The C. F. average of Group III is 8.3 mm. less than that of Group I, while the tooth material is 7 mm. more, which is about the width of a premolar. Very often the cases with exceptionally small C. F. measurements had exceptionally large teeth. Cases in Group III are definitely examples of what used to be

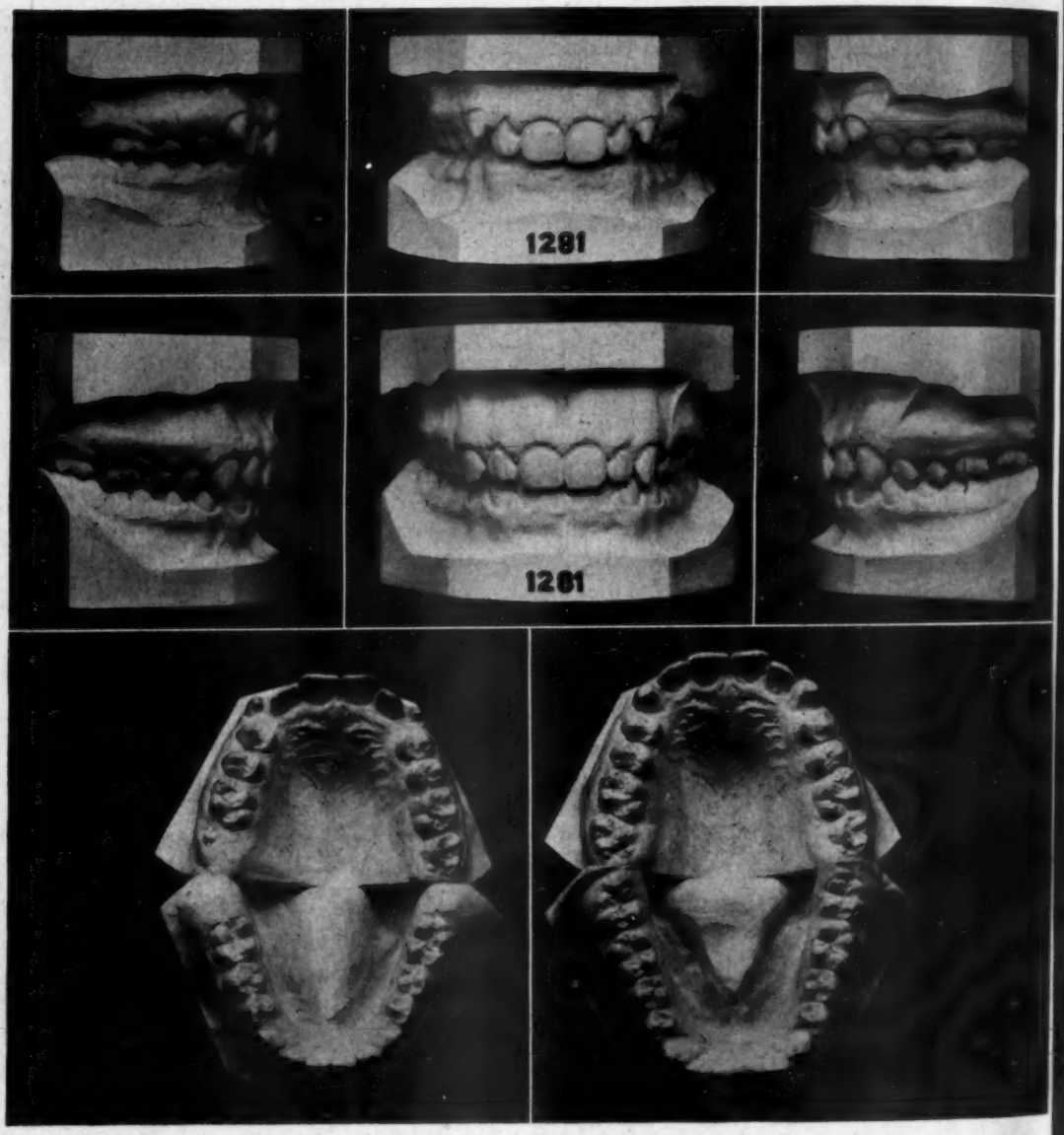

Fig. 11.—Group I case with normal apical base.

referred to as having large teeth and small jaws. Examples of a few of the cases which fall in these various groups are shown in Figs. 11, 12, 13, 14, 15, 16, 17, 18, 19, 26, and 30.

The models before and after treatment of the boy whose photographs appear in Fig. 2, illustrating a normal apical base, are shown in Fig. 11. His C. F.

percentage relationship to his tooth material is 50.5, which is very high. The treatment consisted of the very simple procedure of moving the maxillary molars distally with side hooks and intermaxillary elastics, as has been described by Dr. Lowrie Porter. The anterior teeth were not touched. The Johnson twin-wire appliance was employed in all other cases used as illustrations in this paper.

Fig. 12.—Group I case with normal apical base.

Fig. 12 illustrates another case with a normal apical base before and after treatment. This boy needs coronal expansion in the premolar region, but he has sufficient bone to maintain that expansion. There are some cases in Group I which require considerable expansion. In spite of some irregularity in the mandibular incisors, which may increase as time goes on as an aftereffect of the intermaxillary force which foreshortened the mandibular arch slightly, I believe the boy is much better off than if premolars had been extracted. His face and basal bone both demand a large dental arch.

Fig. 13 shows a case in Group II, the controversial group, we might call it. Expansion is indicated, but there is not quite enough bone to support the teeth if they are moved to their proper arch width. I decided to accept the relapse which will occur rather than to extract teeth. The models of the com-

pleted case show that the apical base above the premolars is not quite as wide as the first premolar width.

A Group III case having a C. F. percentage relationship of 34.7 per cent is shown in Fig. 14. Four premolars were extracted.

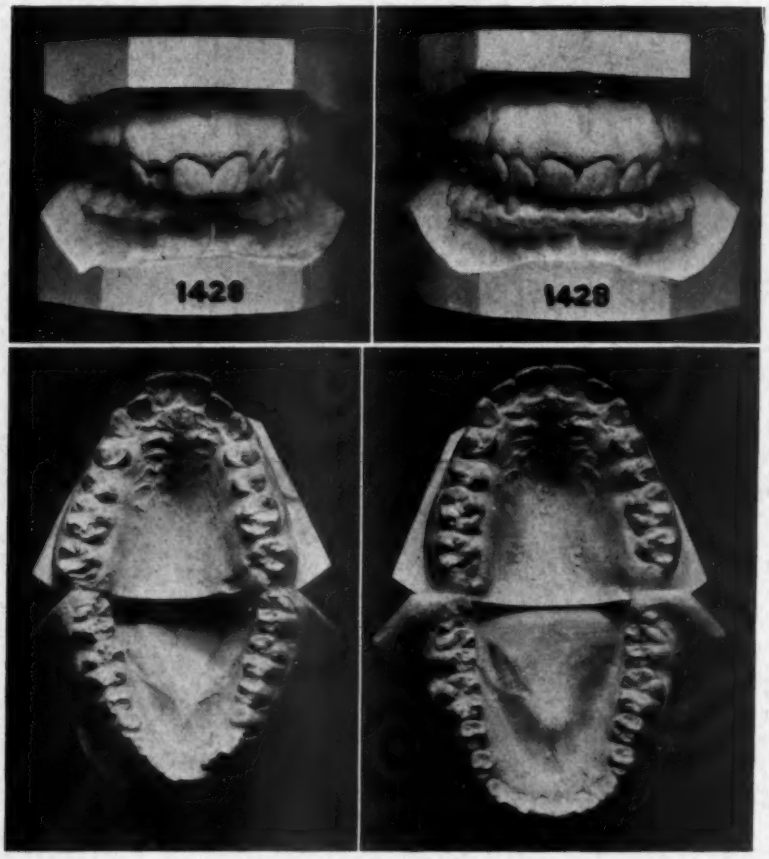

Fig. 13.—Group II case. Some relapse is to be expected.

Fig. 14.—Group III case. Four premolars were extracted.

A comparison of an extremely deficient Group III case with a Group I case having a normal apical base is illustrated in Fig. 15. These two boys have about the same amount of tooth material, but the difference in basal bone, as shown in the models, is obvious even to a lay person.

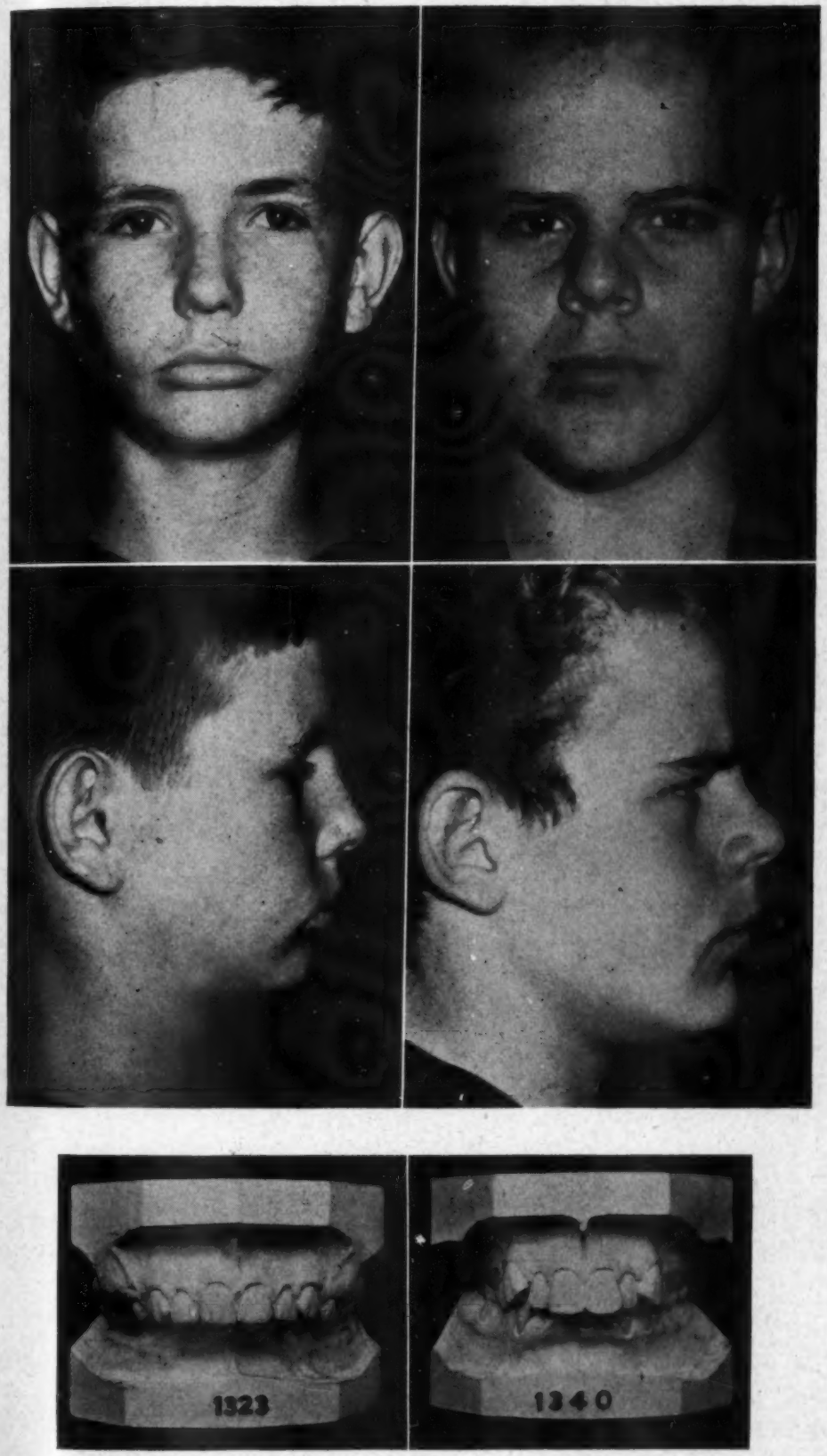

Fig. 15.—Comparison of Group III and Group I case having same amount of tooth material. Group I case (left) has C. F. measurement of 47.5 millimeters. Group III case has C. F. measurement of 31.0 millimeters.

The models before and after treatment of the Group I case having a C. F. percentage relationship of 45.1 per cent are shown in Fig. 16.

Fig. 17 shows the casts of the boy in Group III having a C. F. percentage relationship of 29.8 per cent, the lowest that I have found so far. Four premolars were extracted. The arch remains narrow after treatment and he has

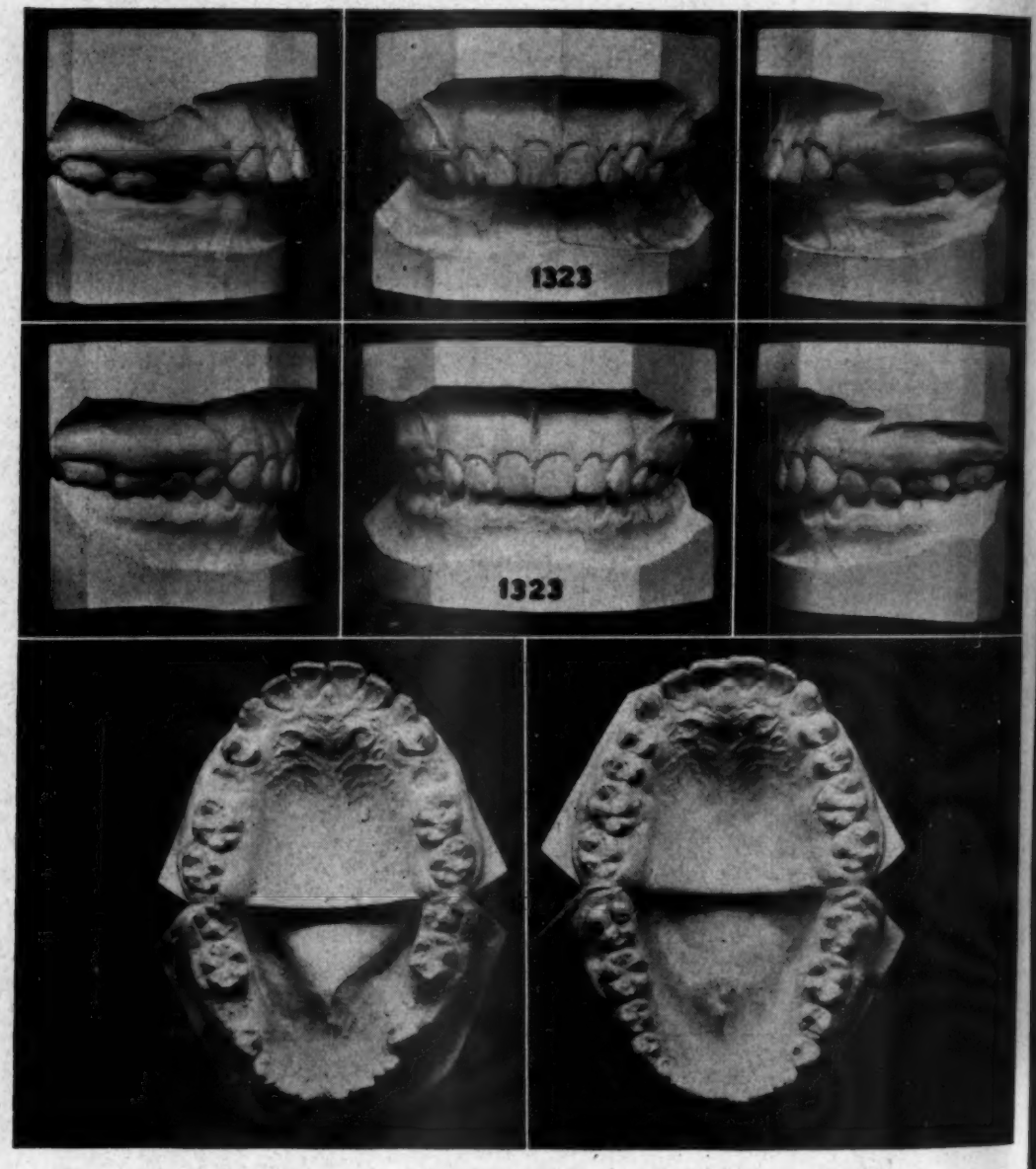

Fig. 16.—Models before and after treatment of Group I case in Fig. 15.

little, if any canine eminence. When first premolars are extracted, canine eminence can be maintained only if the supporting bone between the canines is normal in width. If constricted, the cuspid eminence will be lacking and the face will have a pinched look. Nothing can be done about this except to leave the cuspids blocked out, which holds the corners of the mouth out.

The maxillary apical base of this Group III case was compared with a normal case in Fig. 7. The base will tolerate no expansion of the dental arch in the premolar region, necessitating the removal of four first premolars.

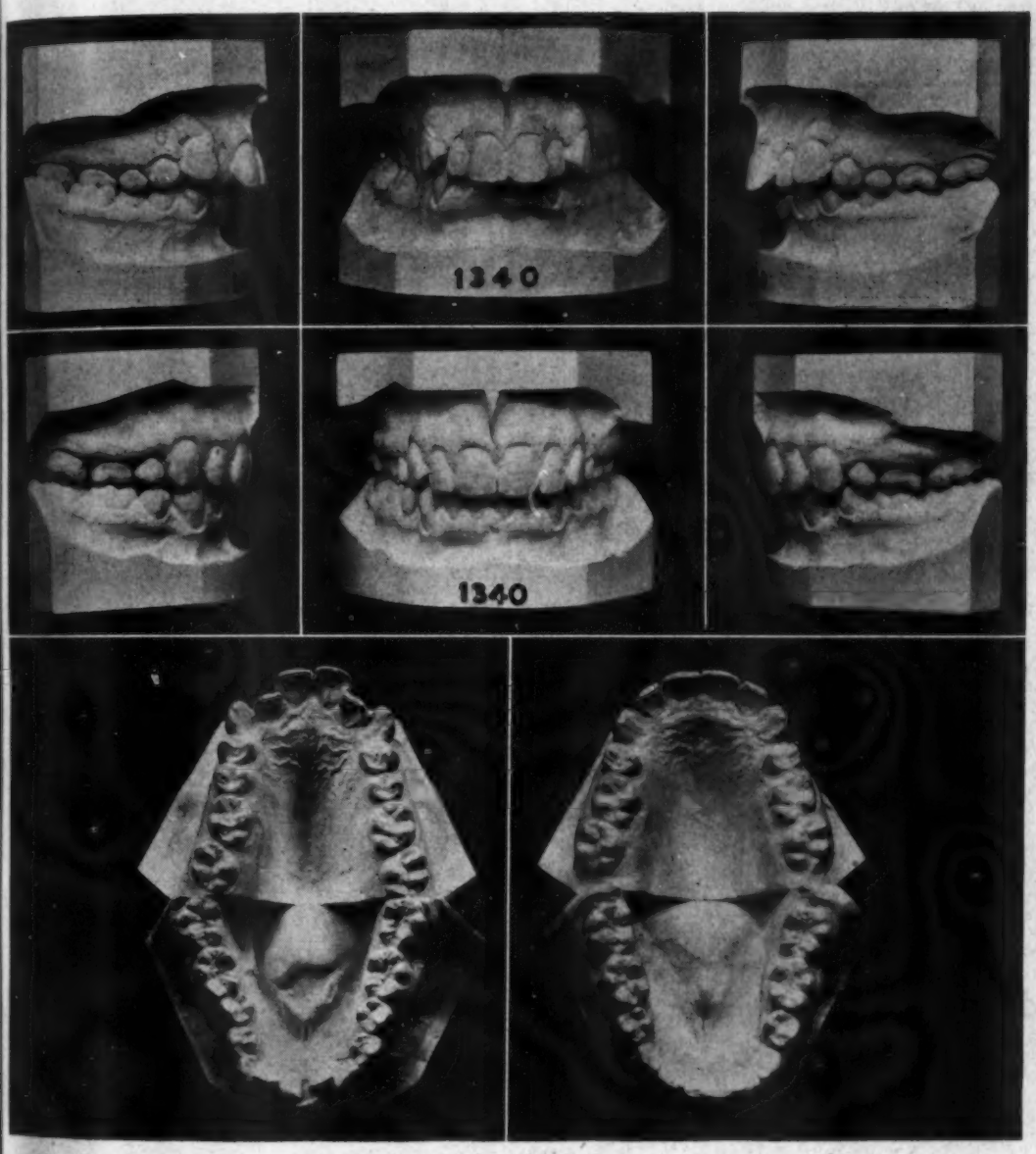

Fig. 17.—Models before and after treatment of Group III case in Fig. 15.

Let us now consider two other cases from the chart in Fig. 10, brother and sister, the boy, Peter G., being in Group I with a C. F. to tooth material relationship of 45.6 per cent, and the girl, Mary G., being in Group III with a relationship of 35.2 per cent. They both have the same amount of tooth material. The models of the boy and the result obtained are shown in Fig. 18, while the models of the girl, who is now being treated, are shown in Fig. 19. Fig. 20 is a composite of the profile radiographs of the brother and sister. One

superimposes almost exactly on the other, except for the maxillary anterior teeth. The girl's teeth protrude more than the boy's. In the past several years, the works of Broadbent, Brodie, Margolis, Higley, and others in cephalometric radiographs have made a great contribution to our facilities for diagnosis. Most of this work has been concerned with profile radiographs of the median plane.

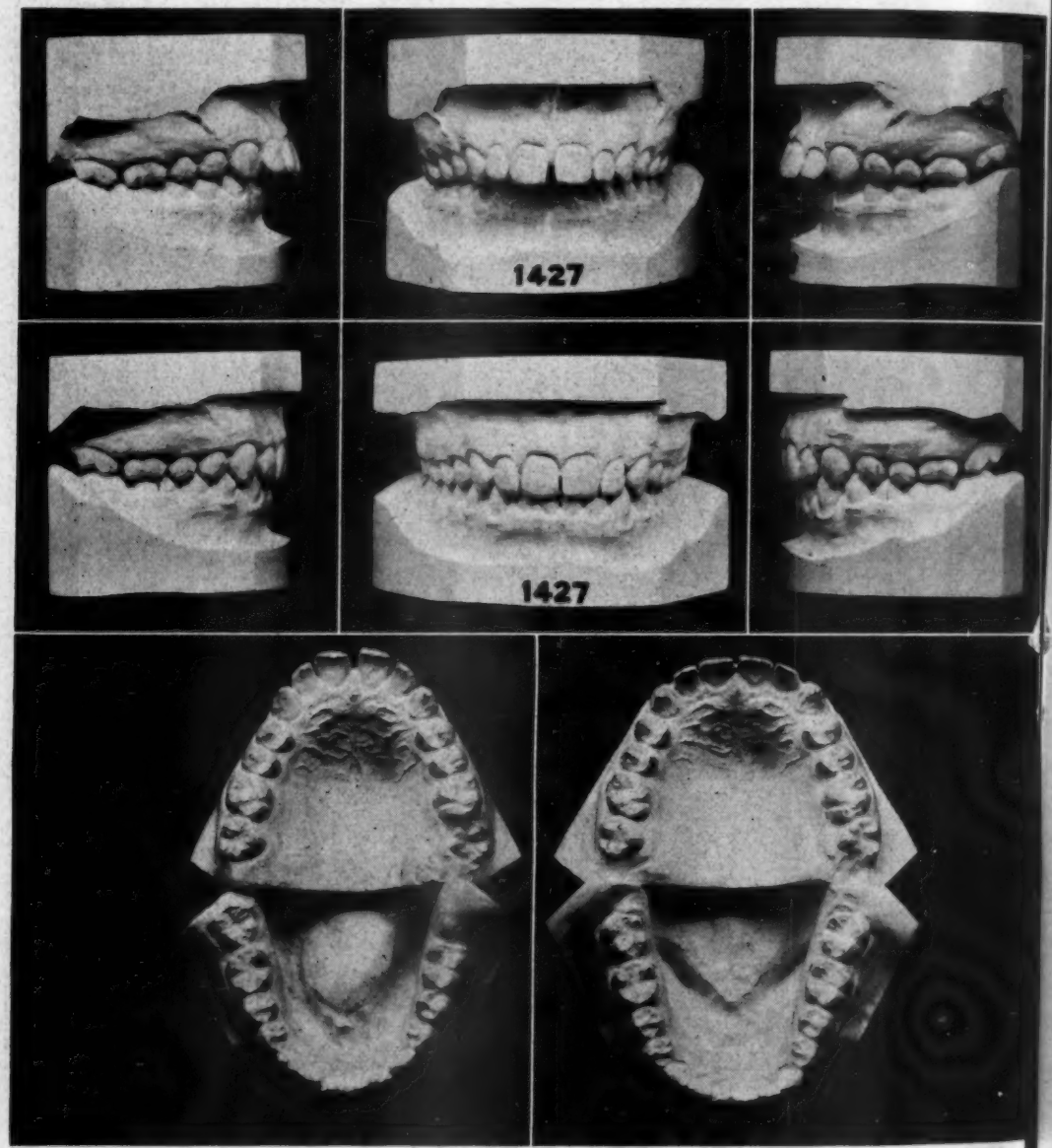

Fig. 18.—Models before and after treatment of Group I case (Peter C., in chart, Fig. 10).

The value of anteroposterior radiographs has been limited because there is too much superimposition of various structures, and so the laterial deficiency which I am trying to describe cannot be clearly demonstrated by them.

The occlusal views of these two cases (Fig. 21) reveal the great difference between them. They are both Class II, Division 1 cases, but one has normal

arch width and also normal apical base and the other has a constricted arch and a constricted apical base, as can be seen by a study of Figs. 22, 23, 24, and 25. The spacing of the anterior teeth in the one case and the crowding of these teeth in the other is in itself an indication of this difference. In order to make this difference more easily visualized, the models of the two cases were cut through the first premolars perpendicular to the median plane. These models show a difference of 18 mm. in the width between the apices of the first pre-

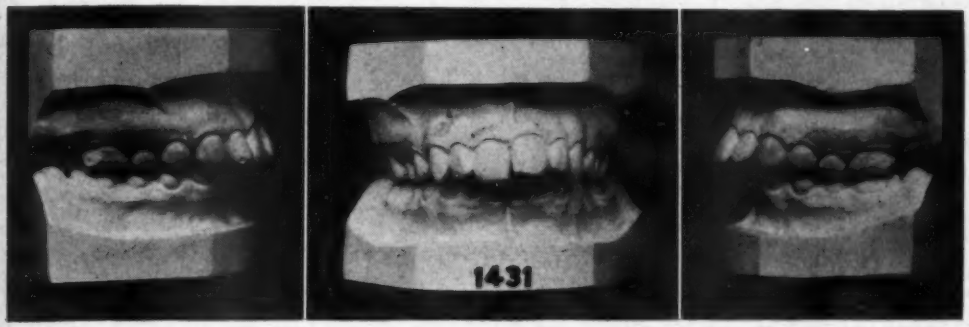

Fig. 19.—Models of Group III case (Mary G., on chart, Fig. 10).

Fig. 20.—Composite of profile radiographs of Peter G. and Mary G, which superimpose except for maxillary anterior teeth. Mary's incisors protrude more than Peter's.

molars (Fig. 22). Bear in mind that both of these children have the same amount of tooth material. By orthodontic stimulation can the same amount of basal support be developed in the one which is deficient as already exists in the one which has a normal apical base? The two models were surveyed, and by superimposing the map of the deficient case on that of the normal case, the amount of basal bone deficiency can be seen. (Fig. 23.) A survey of the maxillary teeth and apical base line of the girl compared with that of the boy is shown in Fig. 24.

At this point, the methods of relating maps to show tooth movements accomplished by treatment, or to make comparisons of different individuals, should be explained. My method of relating the maps of a case to show the movements accomplished by treatment is to superimpose the maxillary apical base line of the case after treatment upon the maxillary apical base line of the original as nearly as possible. If the impressions were both high enough up on the bone, these two lines coincide with slight discrepancies. This is true

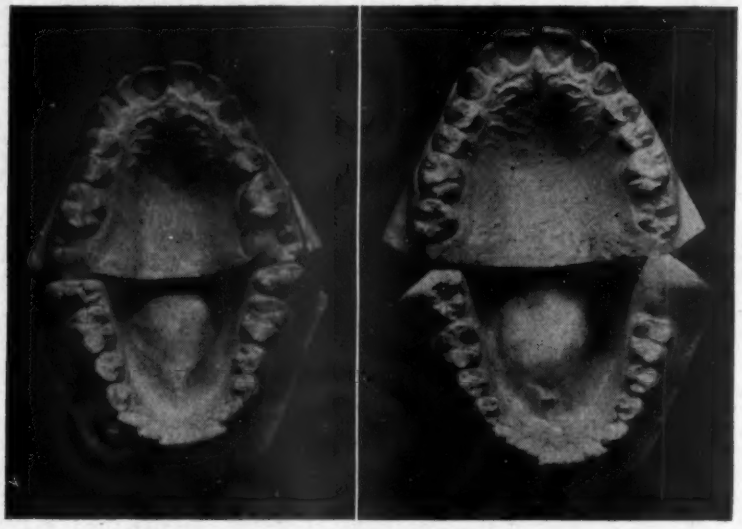

Fig. 21.—Occlusal views of Mary and Peter G. Both are Class II, Division 1 cases. Both have same amount of tooth material. Peter, with normal apical base, has spaces between the maxillary anterior teeth. Mary, whose apical base is constricted, has crowded maxillary anterior teeth.

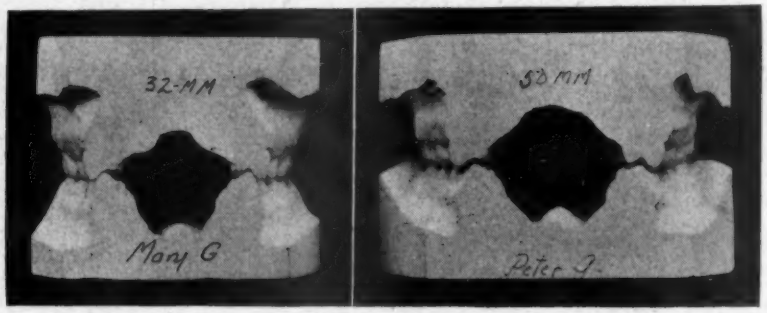

Fig. 22.—Models of Peter and Mary G., cut through the first premolars perpendicular to the median plane.

whether teeth have been extracted or not. I have compared this method of map placement with Stanton's method of coinciding the centroids, and I find there is practically no difference except when extractions have been done. I think when two different individuals are being compared, such as this brother and sister, because their apical base lines are different and, therefore, cannot be placed one over the other, it is better to superimpose the centroid of the denture of one upon that of the other. The method of computing the position

of the centroid of a denture has been described by Stanton. All of the teeth, both maxillary and mandibular, are used in this computation, but in the two cases being compared, only the maxillary arches are shown to make it easier to visualize (Fig. 24). Observe that the maxillary incisors and premolars of the girl are forward of the corresponding teeth of the boy. This was also shown in the composite profile radiographs. The boy's maxillary side teeth require distal movement (it is a Class II, Division 1 relationship), but the girl's side teeth, because of constricted apical base, have erupted in an even more forward position.

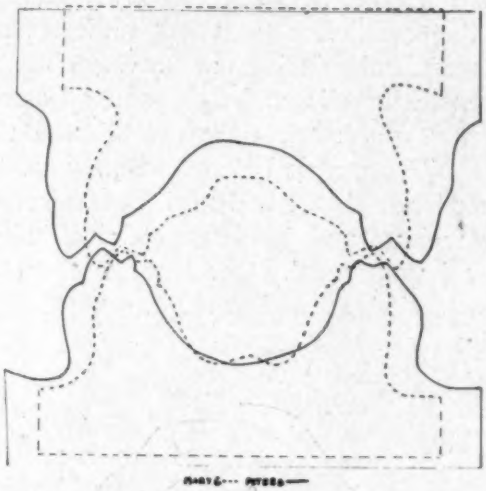

Fig. 23.—Map of cross-sectioned models shown in Fig. 22.

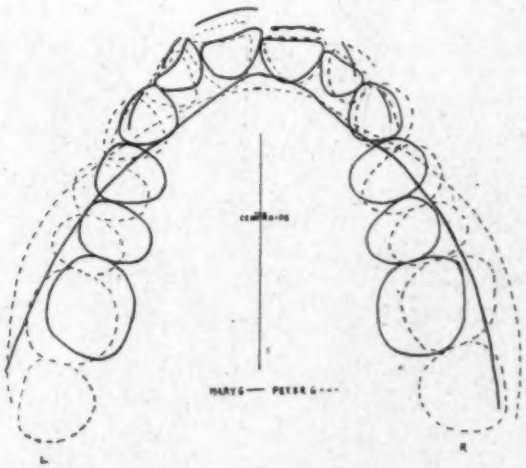

Fig. 24.—Map comparing maxillary apical base lines of Mary and Peter, and showing relative positions of teeth.

A comparison of the girl's maxillary arch before treatment with that of the boy after correction (Fig. 25) indicates the amount of distal movement that would be necessary for the girl's side teeth if they are to be moved to their proper position in relation to the supporting bone. Even if this amount of

movement were possible, the insufficient lateral growth in the premolar region makes it impractical. In my opinion, extraction of the upper first premolars is indicated. I believe that the extraction of the lower first premolars is contraindicated, because the survey of the entire denture (not illustrated) shows the mandible to be too short, and I do not think that the mandibular arch should be shortened in order to tip the mandibular incisors inward.

Previously mentioned in this paper were cases in which the apical base deficiency is apparently not so much a lack of lateral growth as a deficiency of anteroposterior growth. Jimmy H. (942) presents such a case. His front and profile photographs and his profile radiographs are shown in Fig. 26. The profile radiograph of the case before treatment indicates a decided protrusion of both maxillary and mandibular incisors and a very obtuse mandibular Frankfort plane angle. Tweed, Margolis, and Salzmann all stressed the importance of this angle as a diagnostic aid. Note the reduction of the protrusion of the incisors after treatment. The models before and after treatment, in which four premolars were extracted, are shown in Fig. 27. Observe the forward inclination of the maxillary incisors and the backward inclination of the maxillary second molars in the original model. The roots of the teeth are gathered together into the foreshortened base, and so the crowns of the incisors and molars fan out in opposite directions.

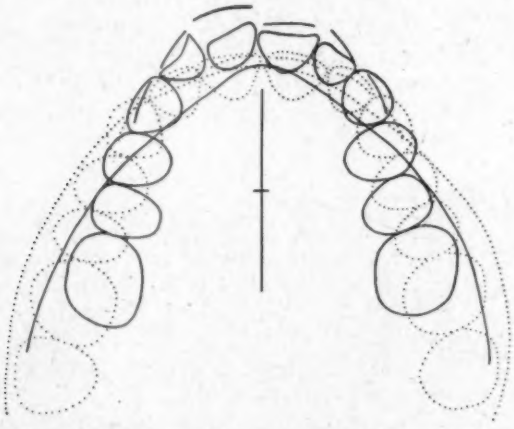

Fig. 25.—Mary's maxillary arch before treatment superimposed on Peter's maxillary arch after treatment.

In Fig. 28 on the left is a composite map of the maxillary arch as it is and as it would have to be if all the teeth were preserved. It shows the tooth movement that would have to be accomplished in order to retract the anterior teeth and provide proper arch width. The apical base line is nearly normal in width and the teeth have been set up within it. On the right is a composite of the mandibular maps showing the movements that would be necessary if all the teeth were to be preserved and given their proper bone support. As can be easily seen, the entire denture would have to be moved distally if the premolars are to be given their proper support and the labial inclinations of the anterior teeth are to be reduced. Such movements are impossible, and even if

they were not, you will notice that the second molars would have to extend beyond the tuberosities. In this case, because of insufficient anteroposterior development, all the teeth have erupted anterior to their normal positions. This type of case differs from those in which there is a lack of lateral growth. The treatment procedure is the same; that is, the reduction of tooth material. In

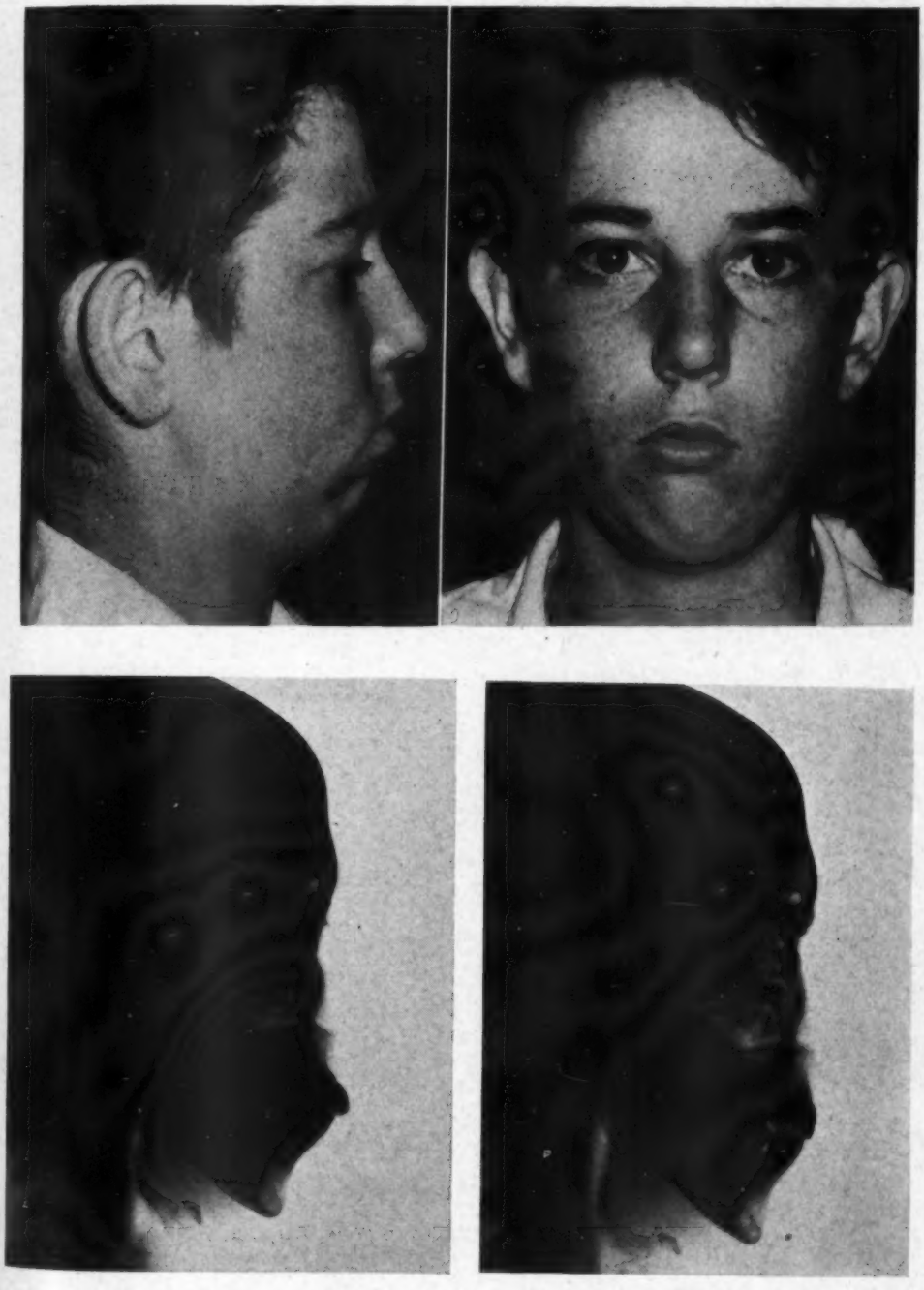

Fig. 26.—Case showing deficient apical base anteroposteriorly.

this case, because it was a Class I case and because the mandibular as well as the maxillary incisors were forward of their normal positions, four first premolars were removed.

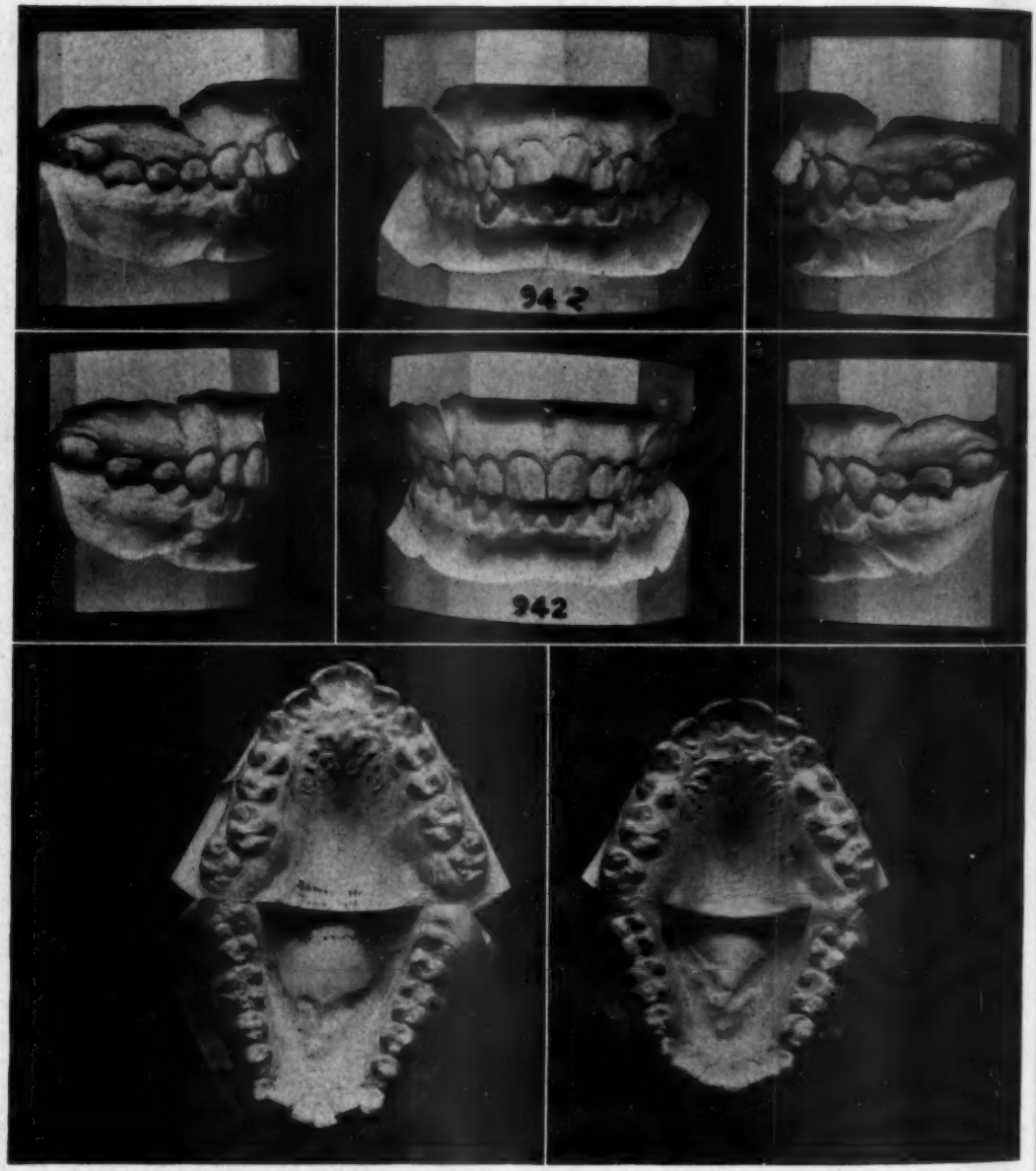

Fig. 27.—Models of 942 before and after treatment, illustrating anteroposterior apical base deficiency.

Fig. 29 shows the occlusal views of the case before and after treatment, and also the maps of the case which indicate the various movements that actually took place. The maxillary and mandibular maps have been separated to avoid confusion of lines. The dotted line is the survey of the original condition and the solid line is the survey of the case after treatment. Notice the coincidence

of the base lines in both the maxillary and mandibular maps before and after treatment. In every case that I have surveyed before and after treatment, the maxillary apical base lines coincide, with slight discrepancies. Sometimes the mandibular base lines coincide and sometimes they do not. When they do not, I believe there has been a mandibular displacement. In this case there has been no such displacement. The maxillary anterior teeth have been retracted (as was also shown by the profile radiographs), the cuspids have moved distally into the spaces created by the extractions, and the second premolars and first molars have moved forward. The maxillary second molars, which were tipped distally, assumed a more vertical angle so that the distal surfaces have not moved forward at all. In the mandible, the central incisors tipped inward, the lateral incisors moved inward only slightly, the cuspids moved distally into the spaces created by the extractions, and the teeth posterior to the spaces all moved forward. There has been no diminution of tongue space.

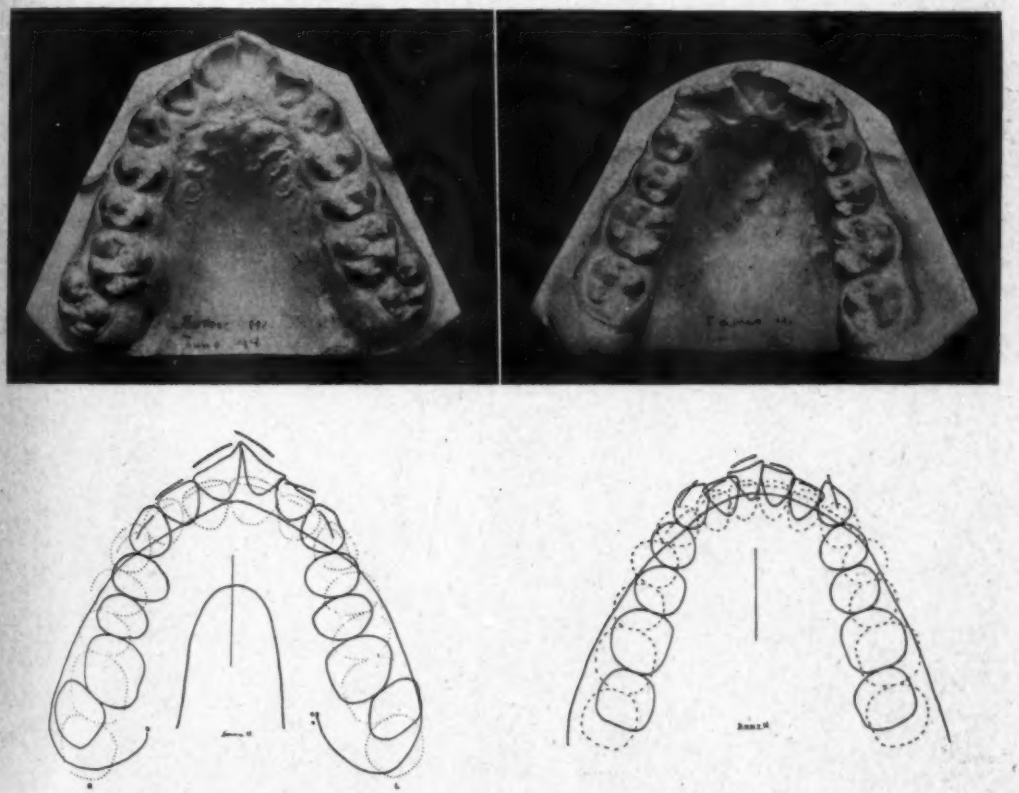

Fig. 28.—Map of case shown in Fig. 27, indicating movements that would be necessary if no teeth are extracted. The movements are impossible.

In the description of the three groups into which the cases analyzed were divided in respect to their C. F. to tooth material percentage relationship, it was previously stated that all of the cases in Group III (a C. F. percentage relationship of 37 or under) except one had teeth extracted prior to treatment. This one case is shown in Fig. 30. It is what used to be called a simple Class I case.

Was there ever a greater misnomer? The models show the original condition, the case after treatment, and, two and one-half years later, the relapse that had occurred. Fig. 31 shows the three maxillary models of the case compared with their maxillary maps. In the second map, notice how the expansion in the premolar region has tipped these teeth bucally, far outside their basal support, and how in the third map, these teeth have moved inward again. I believe

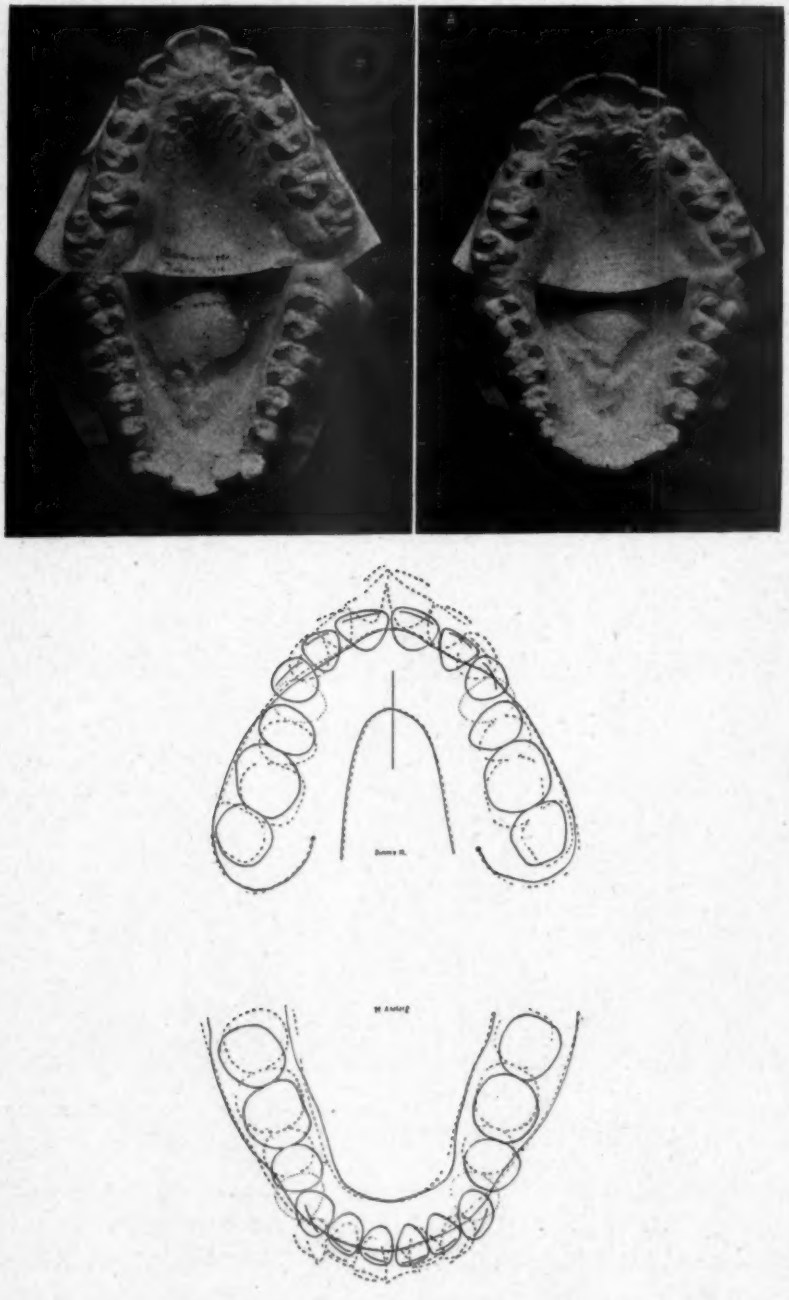

Fig. 29.—Maps of case shown in Fig. 27, indicating actual tooth movements accomplished after removal of four first premolars.

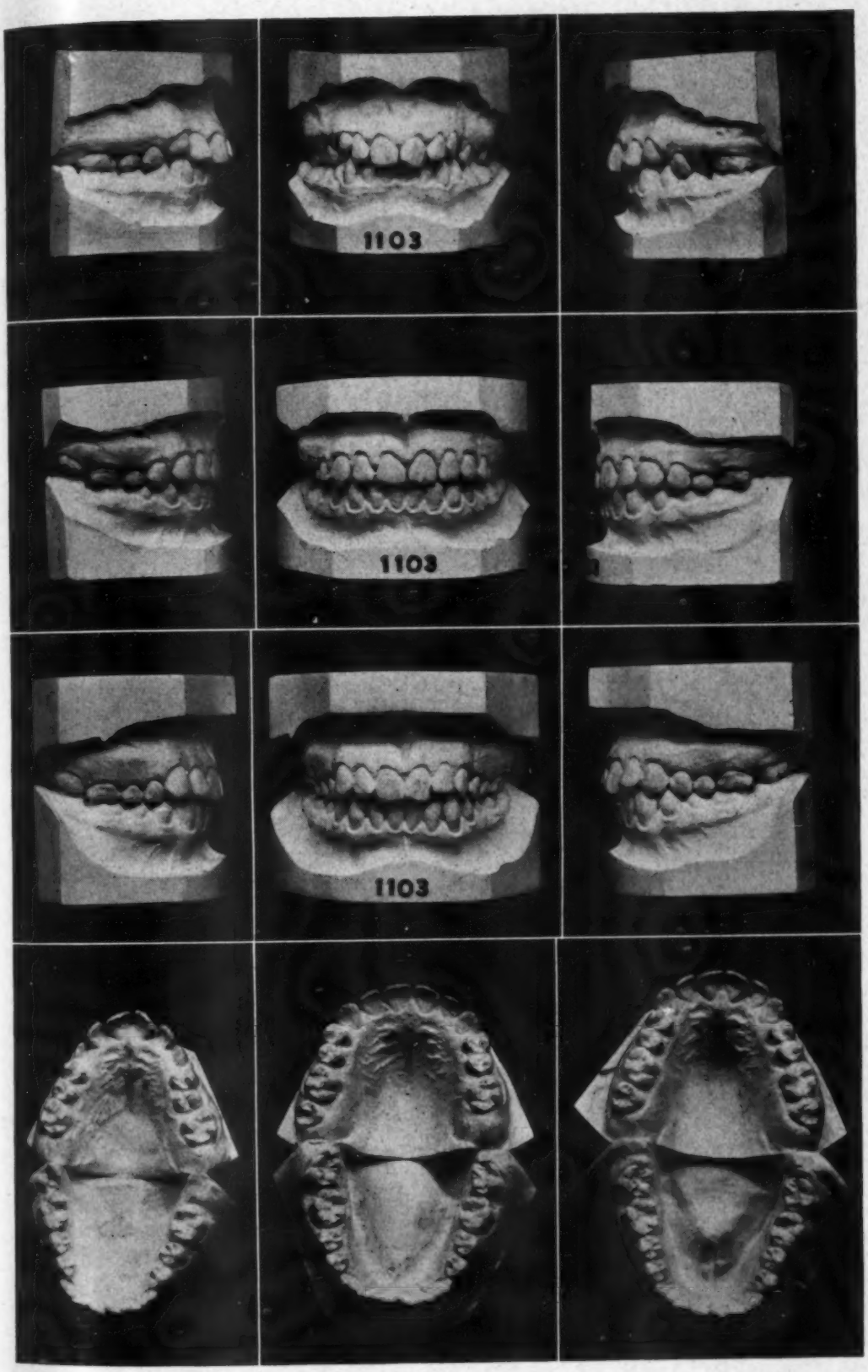

Fig. 30.—Group III case treated without extraction showing original condition, case at completion of treatment, and relapse that had occurred at end of two and one-half years. Four premolars should have been extracted because of deficiency of apical base above premolars.

this relapse will continue. This case is actually deficient in the apical region in the premolar area, and, for that reason, all of the teeth anterior to the first molars, both maxillary and mandibular, are forward of their normal positions. I have to resist an impulse to say that the teeth have drifted forward. I think it is a common fault in orthodontic thinking to regard the malposed teeth as having drifted or moved from their normal positions, as if the case were once normal and various movements of the teeth have changed the normal condition into a malocclusion. In this type of case, if these teeth were ever in a normal position, it was when they were in their crypts with their crowns all huddled together, as Atkinson has so beautifully demonstrated. Somewhere in the process of growth and development, either because of genetic or environmental influences or both, a discrepancy developed between the amount of tooth material, which was already fixed, and the amount of bone being grown to support that tooth material. If this deficiency were in lateral growth, the path of least resistance for the eruption of the teeth was forward, and so, after erupting, the premolars, cuspids, and incisors are all forward of where they should be. Lack of proper basal support makes stability after expansion impossible. In my opinion, the extraction of four premolars was definitely indicated in this case.

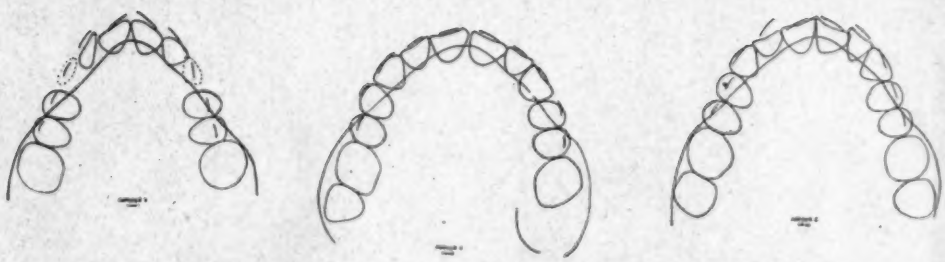

Fig. 31.—Maxillary maps and models of case shown in Fig. 30.

Fig. 32 shows the apical base line before treatment, at the end of treatment, and after the relapse occurred. There has been very little change in this region. Apparently there was a slight expansion in the apical region, but I am inclined to believe that even this small change would not be noted if I had been able to survey far enough up on the bone; in other words, the true base.

Two questions are pertinent at this point. The first is, would the result have been different if root-moving appliances had been used to produce the

expansion? My own answer to that has been gained through sad experience and will be in the form of another question. Am I the only one who has had the premolar apices stand out in the labial plate, as if they were about to pop right through it, or perhaps had already done so? One would have no way of knowing if they had, unless the gum over the root ends were cut away. X-rays will not show whether or not the plate has been pierced.

In the prognathous skull with the maxillary protrusion, notice the denuded apex of the left second maxillary premolar (Fig. 1). It was a sound tooth with apparently no reason for abscessing. The survey of this skull shows this tooth to be forward of its normal position. If a root end can go through a labial plate without orthodontic aid, it must be a very simple matter to force one through with an appliance.

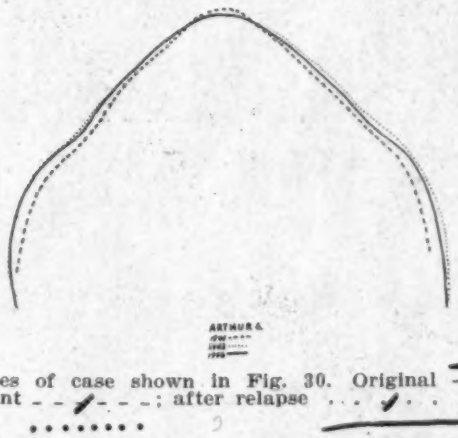

Fig. 32.—Apical base lines of case shown in Fig. 30. Original ——— ; after treatment - - - ; after relapse . . . .

The second question is, will there not be further growth in the apical region which will enlarge this apical base laterally and so help solve our problem? Is not case No. 1103 the exception rather than the rule? I have others which are similar to this. According to an article by Krogman, who summarized some of the growth studies of Hellman, Brodie, M. S. Goldstein, and others, all these investigators seem to agree that by twelve years of age, or about the time that orthodontic treatment is being started in a great number of cases, the width of the face is nearly as great as it will be. However, Atkinson, in a superbly illustrated article entitled, "Some Anatomic Factors Guiding Treatment Therapy," states his conviction that considerable lateral growth takes place in the maxillary and mandibular basal bone in the premolar region after these teeth are fully erupted. Quoting from this article, under an illustration of a skull approximately 8 years of age, he says, "The four incisors and first permanent molars in each arch have erupted and are in function. The cranium is advancing toward its adult size at a faster rate than has the facial portion of the skull. The crowns of the permanent teeth must remain in contact. Their basal support, being the maxilla and mandible, will undergo considerable development as age proceeds, the juvenile face being smaller than that of the adult. The buccal teeth, therefore, will be in a vertical position in the juvenile but, as the face widens, the apices of the roots follow this development and in the adult the inclination of the roots of the buccal teeth is outward." Under

another illustration of an adult skull, he says, "In the adult, as the basal portion of each jaw grows, the apices of the roots are carried laterally while the contact points of the crowns remain in apposition. The adult occlusion has the roots of the teeth torqued outward, harmonizing with the broadened face, while in the juvenile these teeth are in a vertical direction, which is necessary to be contained in the small face."

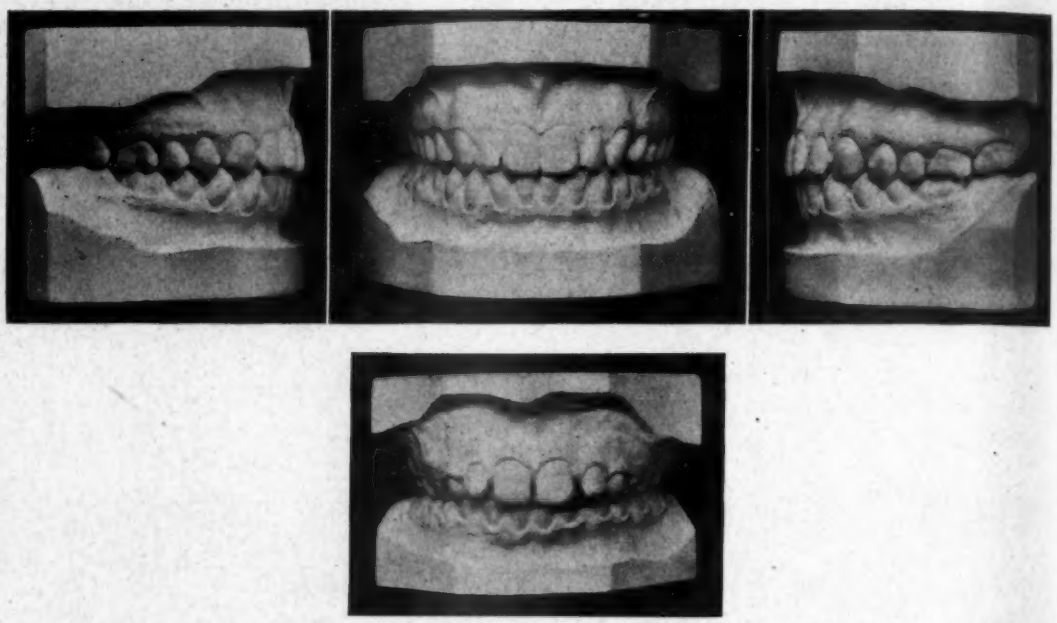

Fig. 33.—Normal denture at 8 and 32 years of age. Spaces between anterior teeth in mixed denture closed naturally.

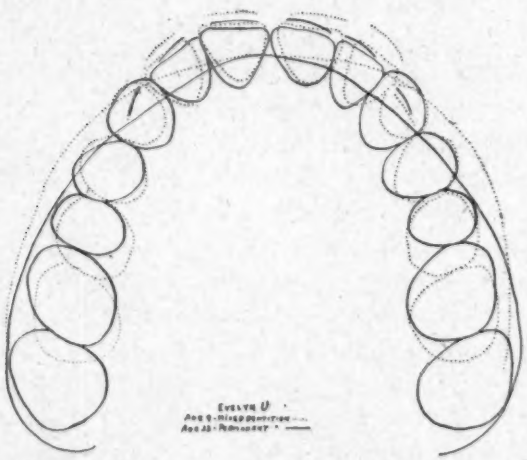

Fig. 34.—Comparison of deciduous maxillary arch with permanent maxillary arch.

Lundstrom also mentioned cases in which there was apparently spontaneous growth of the apical base coincident with expansion of the dental arches. In the cases which I have surveyed, which are not numerous enough to warrant drawing a final conclusion, there is little, if any, lateral growth in this region

after the eruption of the premolar teeth. On the other hand, in the cases which I have measured in the mouth (this measurement can be taken well above the apices of the teeth), I have evidence that in many of them most of the growth in this region occurs at an early age. Some of the largest C. F. measurements occurred in mixed dentures with the deciduous side teeth still present, and some of the narrowest were in seventeen-year-old individuals, whose skeletal growth was apparently about complete.

Fig. 35.—Models of an individual made at the ages of 12 and 37.

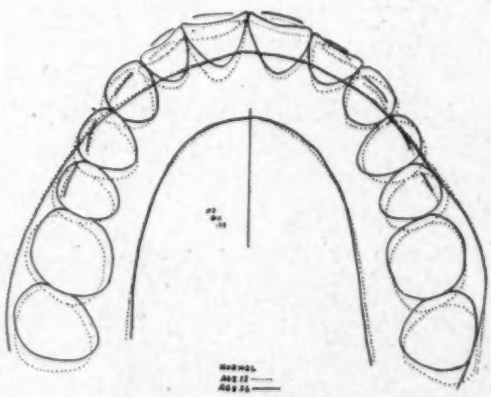

Fig. 36.—Comparison of maxillary surveys of case shown in Fig. 35.

Fig. 33 shows two models of the same patient made at the age of 8 and at the age of 32. Fortunately, the first model was made from plaster impressions. I took the impressions in order to keep the case under observation. No treatment was ever needed. The spaces which existed between the anterior teeth in the mixed denture closed naturally later. Surveys were made of these models and a comparison was made. The movements that the teeth undergo in changing from the mixed to permanent dentition are indicated and are very interesting, but we are concerned here with the bone above the teeth. For the sake of clarity, I have separated the maxillary and mandibular maps.

Fig. 34 shows a comparison of the maxillary arch of the mixed and permanent denture. The solid line represents the apical base line of the permanent denture and the dotted line represents the apical base line of the deciduous denture. The apical base line of the mixed denture actually stands outside that of the permanent denture. This, of course, is due to the bulging of the unerupted cuspids and premolars. After the eruption of these teeth, there was an actual diminution in size in the region of the second premolars. The arch has grown in length to accommodate the second molars.

Fig. 35 shows two models of an untreated normal denture made when the girl was 12 and 37 years of age. The change in the anterior teeth, which looks like an orthodontic relapse, is interesting, and is accounted for by the survey of the case shown in Fig. 36. This survey shows no change in the base lines, nor does it show any torqueing outward of the premolar roots, as described by Atkinson. The only change is a slight sliding forward of the posterior teeth, which accounts for the shift in the anterior teeth. In the mandibular map (not illustrated) the same forward movement of the posterior teeth has taken place, producing the crowding of the anterior teeth shown in the model. In this case, the teeth really did drift toward abnormal positions.

CONCLUSIONS

1. A normal occlusion must be supported by a normal apical base.

2. A large percentage of malocclusions which orthodontists are called upon to treat have either a deficient or deformed apical base. The amount of this deficiency varies.

3. Normal lateral development of the apical base in the premolar region takes place at an early age, that is, before the shedding of the deciduous side teeth.

4. Whenever the apical base in the premolar region is of insufficient width, the premolars will be forward of their normal positions if in normal contact and the anterior teeth will be either crowded or forward of their normal positions.

5. Anteroposterior growth continues until it is time for the third molars to erupt. However, this growth may be insufficient or lag behind tooth eruption, producing either a positioning of the buccal teeth anterior to their normal positions or impactions of the second or third molars, and sometimes both.

6. Mechanical orthodontic therapy cannot directly affect the size of the apical base. Indirectly, by making possible normal muscular action in breath-

ing, chewing, swallowing, facial expression, etc., it seems plausible that the apical base could be given an opportunity of achieving more normal dimensions, although I have been unable to obtain evidence to substantiate such an assumption. Many cases with models which record the bone outline as described would have to be kept under observation for many years to prove or disprove such a possibility.

7. In the normal occlusions which I have measured, there is only a small variation, about 7 per cent in the relationship which exists between tooth material and arch width in the maxillary first premolar region.

8. The width of the apical base, measured above the apices of the maxillary first premolars, governs the dental arch width in the first premolar region. Unless the base is larger than the premolar width, the only way the arch width can be increased in the premolar region is to move these premolars distally into a wider part of the base.

9. In the measurements of two hundred individuals, all of them with some dental irregularity, there was a variation of 38 per cent in the width of the apical base, measured above the apices of the maxillary first premolars. Very often, cases with exceptionally narrow intercanine fossa width had exceptionally large teeth.

10. In any case of malocclusion, the supporting bone can be surveyed, and its relation to the existing tooth material established. When this survey is compared with its map of occlusion, using the bone outline as a guide, it can generally be determined whether or not it is possible to maintain a full complement of teeth. Borderline cases still remain to plague us. If the tooth material must be reduced by extractions, the tooth movements necessary to close the spaces can be planned in advance and demonstrated after treatment. This method of analysis is suggested as an aid in deciding treatment possibilities.

11. We must make every effort to recognize the limitations imposed by nature upon our efforts, and be able to differentiate between the cases which can be treated successfully without extraction, cases which can be treated successfully if the tooth material is reduced, and cases which would be better off with no treatment at all.

650 Main Street

CASE REPORT: PROGRESSIVE MALOCCLUSION ASSOCIATED WITH DILANTIN THERAPY

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DILANTIN-SODIUM, otherwise known as sodium diphenyl hydantoinate, is a drug first employed in the treatment of epilepsy by Merritt and Putnam[1] in 1938. It is an active anticonvulsant and mild hypnotic which has proved largely successful in control of the seizures which characterize that malady. To be effective, the drug is taken daily by the patient.

Various investigators have noted certain toxic reactions to the administration of dilantin-sodium. Kimball and Horan[2] classified these into two groups: (a) acute toxic reactions, such as skin rashes and changes in the nervous system, and (b) late reactions, notably gingival hypertrophy.

In the matter of hypertrophy of the gingivae, the findings show wide divergence.[3-7] It can be stated, however, that in aggregate, the reports point to an incidence of gingival changes in, roughly, 50 per cent of the cases studied. The gingival reaction may range in intensity from a mildly granular or warty mucosal surface to a giant hyperplastic formation which tends to engulf the teeth and extend so far incisally as to interfere with mastication.[8]

The classical picture of the gingivitis associated with dilantin therapy is one of distinctly massive growth of the gum tissues which may take either of two forms. One may consist of an increase in size of the interdental papillae in all dimensions, with the formation of shallow clefts at the point of coalescence with adjacent lobules. The other may start as a crescentic formation at the gingival margin which spreads and enlarges, creating the appearance of a festoon along the dental arch.[8] Both forms may eventually lead to a generalized hyperplasia which is usually more prominent on the labial than lingual and at the onset more evident in the anterior than posterior.

It must be noted, however, that the majority of these reactions are relatively mild. While the gums may have a somewhat inflammatory appearance, tenderness and hemorrhage are extremely rare. The lobules and swellings are smooth and firm, varying in color according to the systemic condition of the patient and the degree of local irritation from calculus.[7] An interesting feature of the condition is the absence of hyperplasia in edentulous areas. Likewise, the mucosa underlying the pontics of fixed bridges remains normal. Stern and others[8] found no correlation with age, sex, status of oral hygiene, or the therapeutic effectiveness of the drug. It has been found that the hypertrophy slowly tends to disappear upon withdrawal of dilantin.[8]

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Microscopically, the typical hyperplastic gingivae associated with this medication demonstrate epithelial thickening and downgrowth into the underlying stroma. The connective tissue also shows proliferation with increase in the number and size of capillaries, but little edema.[7] Granulation tissue may be present and, occasionally, in advanced cases, small calcified masses or heteroplastic bone are found within the corium.[9] A notable feature of the hyperplastic connective tissue is the formation of numerous collagen fibrils, either condensed into thick bundles or irregularly distributed throughout the stroma, but always in great numbers.[10] This fact may account for the toughness and pronounced resiliency of the tissue on gross examination.

The case to be considered in this paper definitely presents one of the rarer types of hyperplasia associated with the use of dilantin, the giant gingival thickening which, at its crest, rose so far incisally as to embarrass mastication. It may serve to illustrate the irresistible expansive force of proliferating tissue, such as is found in the crushing of surrounding structures by a neoplasm.

A search of the literature relating to the so-called dilantin-hyperplasia reveals illustrations depicting large masses of gingival tissue standing between separated anterior teeth, but to the author's knowledge no mention has been made of the fact that the spaces might have resulted from the presence of the hyperplasia. As the case under discussion has been observed almost from the onset of the complication, there was ample opportunity to note the change in position of individual teeth. On the other hand, most cases described in the literature have exhibited conditions present only at the critical point of the deformity.

A series of casts has been made over a period of five years and will serve to indicate the changes which have taken place during the course of dilantin therapy.

The patient was an 18-year-old girl who had been an epileptic since puberty. The disorder had been controlled until six months before examination by the administration of hypnotics such as phenobarbital and thereafter by dilantin-sodium. These facts were not discovered at once because the mother was extremely reticent about the patient's condition and the use of any medication. Information as to the administration of dilantin-sodium was withheld until later when the remarkable condition of the gums made the admission necessary.

The patient was presented for treatment largely for esthetic reasons. The case was of Class I type with relatively good occlusion. The prolonged retention of the deciduous right maxillary cuspid had resulted in lingual eruption of the permanent cuspid. The arches, while slightly narrow, hardly merited orthodontic treatment. The patient, being fastidious, desired correction of the cuspid tooth. The gums displayed an unusual hypertrophy in the area of the mandibular anterior teeth on the labial and, to a lesser degree, the lingual. The maxillary gingival tissues were slightly hypertrophied in the same regions. There was a mild hyperemia, but no tenderness or bleeding. The periodontist who had been treating the case stated that following a Vincent's infection some time

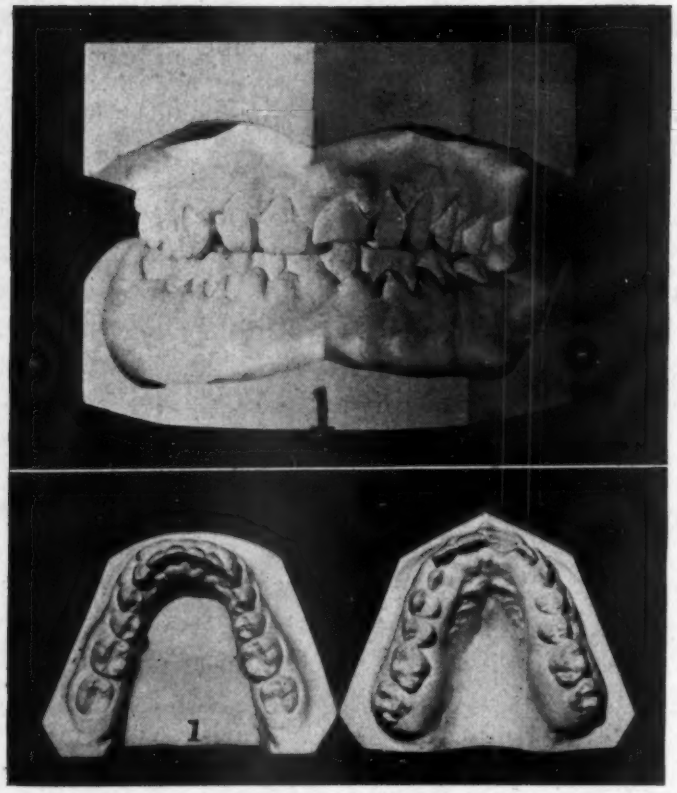

Fig. 1.—Anterior and occlusal views of original casts, showing early stage of gingival hypertrophy.

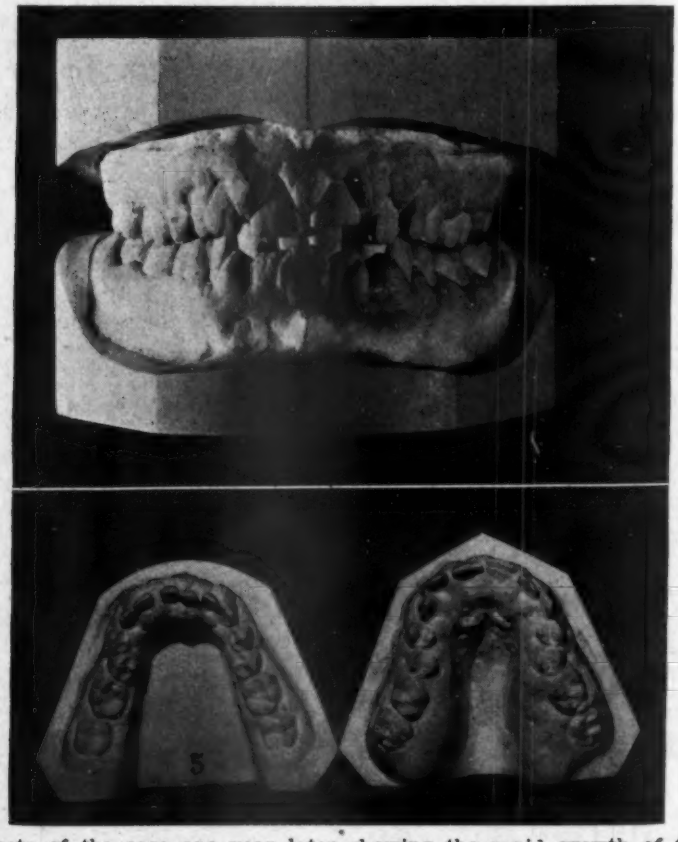

Fig. 2.—Casts of the case one year later showing the rapid growth of the soft tissues, with formation of clefts in incisal areas. Anterior teeth beginning to separate and arches starting to expand abnormally as tissue proliferation continues. Orthodontic treatment discontinued after first three months.

previously, he had found a poor hygienic condition in the mouth of the patient and that the hypertrophy was now being reduced. (Fig. 1.) An appliance was placed on the labial, carrying the cuspid into position.

Within three months, the gingival hyperplasia had grown to such proportions that the soft tissues were beginning to encroach upon the appliance. The gingivae were still painless and displayed no inflammation, edema, or tendency to hemorrhage, instead assuming a tough, resistant, or rubbery consistency. It should be emphasized that the patient had been most meticulous in the matter of oral hygiene, and had been receiving periodic treatments at the hands of an experienced periodontist.

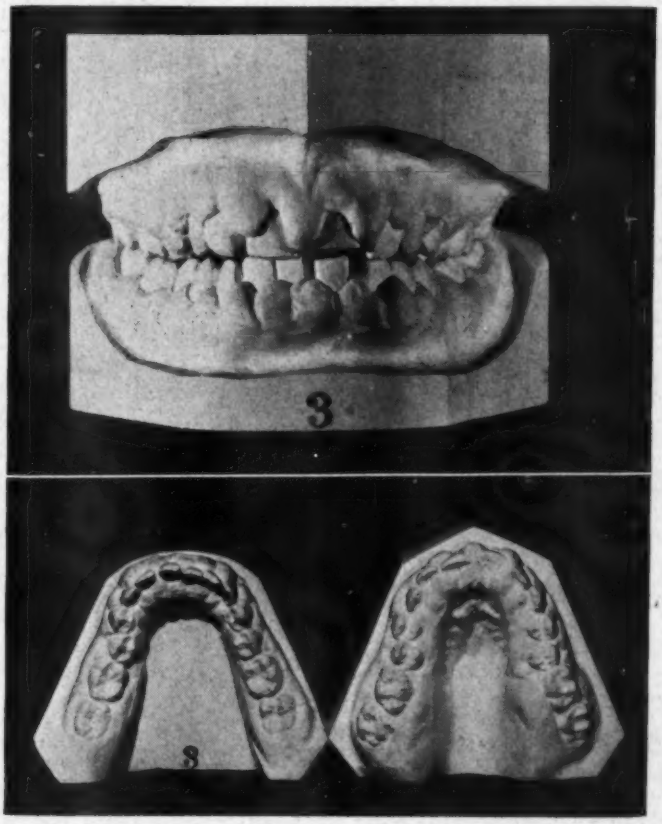

Fig. 3.—Two years after case was first seen. Note contact of mandibular incisors against palatal tissues. Incisors separated and nearly buried by gingivae. Soft tissues in posterior palatal areas markedly enlarged. Malocclusion increased.

In view of this progressive gingival condition and the fact that the cuspid was in a fairly satisfactory position for proper eruption, orthodontic treatment was discontinued, but the case was kept under observation. When confronted with that decision and the presence of this now classical picture of oral disorder, the patient admitted to the taking of dilantin.

Within a year, the gingival tissues surrounding the incisors ballooned to a greater extent, and the anterior teeth, while having no palpable mobility, showed definite signs of protrusion and separation (Fig. 2). The enlarged

palatal tissues were now contacting the mandibular incisors. In the maxilla, all buccal teeth except the second premolars displayed a marked lateral movement. The corresponding mandibular teeth followed the same course, but to a smaller degree, the second premolars remained stable. In no case was there any separation present between the posterior teeth.

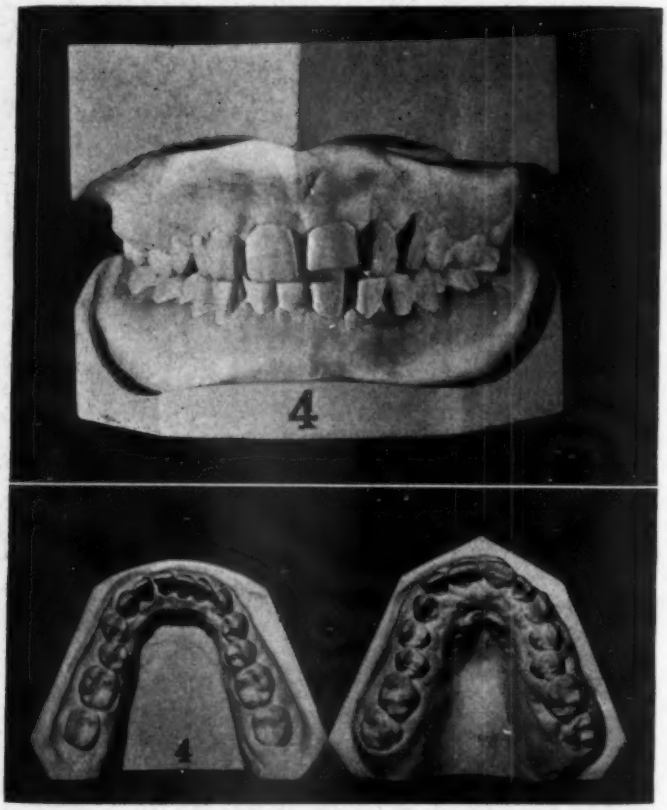

Fig. 4.—One month after excision of all hypertrophied tissues. Healing has taken place. Separation of anterior teeth rapidly disappearing. Note that the malocclusion in the posterior region remains the same.

The case was examined at intervals throughout the following year, disclosing a gradual progression of the conditions just described. At the end of this period, the hypertrophy had assumed such proportions that the patient was unable to masticate properly due to the painful contact of the mandibular teeth upon the palatal tissues (Fig. 3). The motions of the tongue were restricted, making articulation and deglutition difficult. The incisors were protruded and separated in some places by about 2 mm., the interdental papillae in the maxilla having reached a point just short of the incisal edges (Fig. 6). The gums in all other areas had enlarged similarly, although the most marked advances of those in the posterior region were in the palate. Despite this condition, the maxillary buccal teeth held their previous locations, the second premolars actually moving to the lingual. The mandibular teeth at the sides of the arch continued their transition in a buccal direction.

In order to relieve the pain incurred in chewing and to bring about a better hygienic condition, the decision was made to remove the excess of gum tissue. An oral surgeon, by means of electrocoagulation, excised the hypertrophied tissues in all areas of the mouth. With healing, the gums assumed their normal levels. Almost at once, the protrusion and separation of the anterior teeth began to be reduced, all of these teeth reverting to their original positions in about three months' time. The cuspid which had been corrected orthodontically maintained its proper relationship in the arch. The posterior teeth did not return to their original positions. (Fig. 4.)

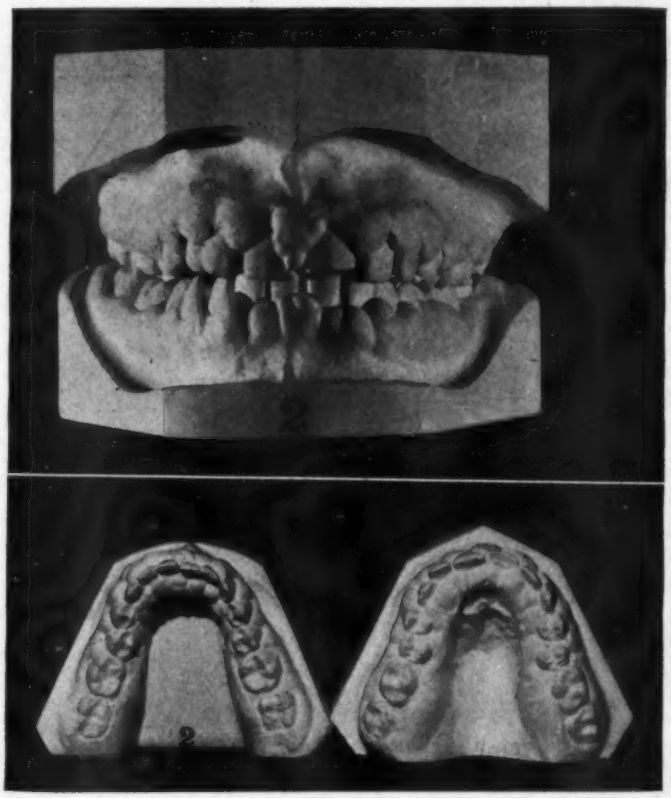

Fig. 5.—Two years after excision. Dilantin therapy continued. Malocclusion in both anterior and posterior greater than at any earlier period. Note extreme hypertrophy lingual to maxillary molars.

Although efforts were made to decrease the dosage of dilantin, the epileptic condition of the patient necessitated its continuance at almost the previous level. Within several months, the beginnings of a recurrence of the gingival hypertrophy were evident. Over a period of approximately two more years, the progress of the enlargement followed a course which was similar to that experienced previously. Viewed at the end of that time, the hypertrophy was identical in character to but generally not quite as massive as that which existed just before the resection. (Fig. 5.) An exception to this was in the palatal area opposite the molars, where the enlargement was much greater.

The degree of malocclusion, however, had increased. The protrusion and separation of the anterior teeth were somewhat more marked, although the spaces did not occupy the same positions as previously. The cuspids, first premolars, and second molars had moved laterally more than before, while the second premolar and first molar span was slightly narrowed. Although the anterior palatal tissues were considerably thickened, the mandibular incisors did not strike them at a sufficient depth to cause pain. Certain posterior teeth, notably the second premolars and first molars, now met in a more cusp-to-cusp occlusion than formerly.

A better understanding of the extent of the deformity which occurred may be gained by comparing the initial and final casts (Fig. 6).

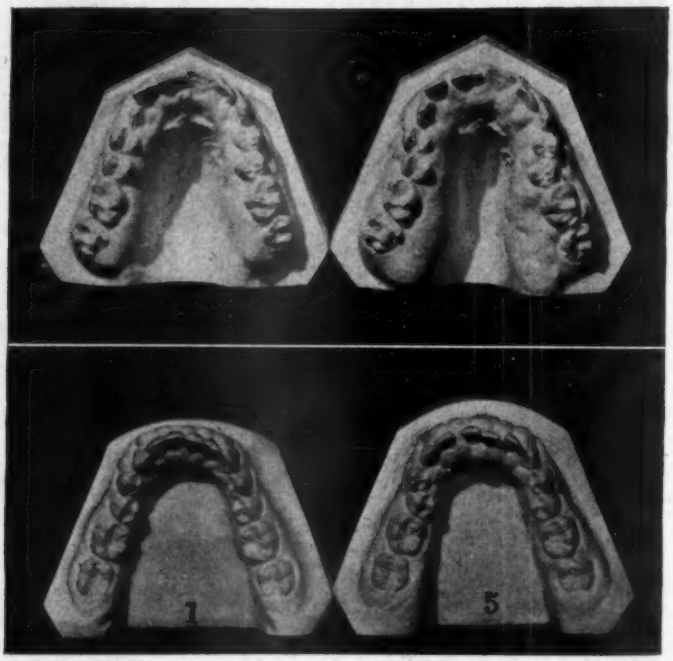

Fig. 6.—Comparison of original casts (left), with casts shown in Fig. 5 to illustrate the extent of the hypertrophy and malocclusion.

To bring the case up to date, the patient, during the last year, has been maintained partially on the drug, Mesantoin, the toxic reactions of which apparently do not include gingival disorders. The physician in charge, however, has been unable to substitute this preparation completely, so that the patient is still receiving a moderate amount of dilantin-sodium daily. The condition of the gums and the degree of malocclusion remain essentially unchanged.

REFERENCES

1. Merritt, H. H., and Putnam, T. J.: Sodium Diphenyl Hydantoinate in Treatment of Convulsive Disorders, J. A. M. A. 111: 1068, 1938.
2. Kimball, O. P., and Horan, T. N.: Use of Dilantin in the Treatment of Epilepsy, Ann. Int. Med. 13: 787, 1939.
3. Kimball, O. P.: Treatment of Epilepsy With Sodium Diphenyl Hydantoinate, J. A. M. A. 112: 1244, 1939.

4. Merritt, H. H., and Putnam, T. J.: Use of Sodium Diphenyl Hydantoinate as an Anticonvulsant, J. A. M. A. **112**: 2190, 1939.
5. Fetterman, J. C.: Dilantin Sodium Therapy in Epilepsy, J. A. M. A. **114**: 396, 1940.
6. Frankel, S. I.: Dilantin Sodium in the Treatment of Epilepsy, J. A. M. A. **114**: 1320, 1940.
7. Glickman, I., and Lewitus, M. P.: Hyperplasia of the Gingivae Associated With Dilantin Therapy, J. Am. Dent. A. **28**: 199, 1941.
8. Stern, L., Eisenbud, L., and Klatell, J.: Analysis of Oral Reactions to Dilantin-Sodium, J. Dent. Research **22**: 157, 1943.
9. Thoma, K. H.: Dilantin Hyperplasia of the Gingivae, Case Report No. 37, Am. J. Orthodontics and Oral Surg. **26**: 394, 1940.
10. Zegarelli, E. V., and Ziskin, D. E: Bone Heteroplasia in a Case of Dilantin Hyperplastic Gingivitis, Am. J. Orthodontics and Oral Surg. **29**: 152, 1943.

Medical Arts Building

A CONCEPT, A COMPARISON, A CONCLUSION

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AS THIS is my first effort as an orthodontic essayist, and as all of my orthodontic experience has been in association with my father, it would be presumptuous of me to claim this presentation to be entirely original. It does represent, however, the result of endless discussions, many of them based on comparisons with other ideas and methods of procedure with which you are all familiar. In this respect, it represents some fairly crystallized conclusions of my own which seem logical to me and at the same time simple to understand and practical in their application.

Any beginner, like myself, is bewildered by the maze of conflicting ideas and prejudices which seem to dominate every orthodontic meeting. I was strongly advised by one of my friends, in my own age group, not to stick my neck out at this time by touching on anything involving fundamentals of a highly controversial nature, which are still in the explosive stage. However, the problems of a beginner are exactly the same as those of a man who has practiced for years, and the sooner a beginner orients himself both in his concept and his methods of procedure, the greater will be his chance of success. This concept, it seems to me, should be an all-inclusive picture of the desired final result. This naturally leads to fundamentals which, when looked at in their comprehensive aspect, are not hard to understand.

I hope I will not commit the offense of boring you with any lengthy discussion of a scientific or philosophic nature. I would be completely out of character if I did. Neither shall I attempt any lengthy descriptions of technical details which can be most clearly and effectively understood by a few illustrations.

I have been told, it seems since I was able to talk, that success or failure in orthodontics depends on three major decisions, that the answers to these can never be based on scientific observation alone, and that judgment in making them will never be perfect, even after a lifetime of experience. These problems are at least simple enough to state.

The first of these is what can be termed structural balance. By this we mean the physical and esthetic proportion desired between total tooth structure and total bone substance to establish a mechanically stable machine. In order to have a correct concept of this point, it is well to compare extremes of *natural* variation between which most of our problems lie. Fig. 1 (left) represents one extreme of a case with unusually large teeth in a comparatively smaller

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amount of bone, and the other model shows a case with very small teeth supported by a much larger amount of bone. Between these two examples lie millions of cases with varying degrees of natural disproportion and requiring varying degrees of judgment in solving them satisfactorily. It can be seen clearly how the amount of tooth structure compares with the amount of bone in each case.

Fig. 2 illustrates a rather constricted case involving very large teeth in a very small amount of bone. The four first premolars were extracted and the canines were started distally by the use of very small coiled springs on simple labial arches. The Johnson twin wire was soon substituted to continue the proper alignment of the anterior teeth until, due to the extractions and the new alignment, there was obtained a satisfactory structural balance shown in Fig. 3. The questions foremost in your minds are probably these:

Are extractions necessary? And if so, in what percentage of a normal practice do they occur? Opinions seem to vary between 0 and 90 per cent in some practices. It is between 15 and 20 per cent in our practice.

Fig. 1.

The second problem concerns functional efficiency which is the mechanical economy making the masticatory system a satisfactory machine. In this classification we have deep overbites, overjets, cross-bites, open-bites, and those underjets not requiring surgical intervention.

The third and surely not the least important problem is that of esthetic harmony, meaning the artistic balance between the masticatory system and the surrounding structures. This is illustrated by Fig. 4, having a satisfactory combination of structural balance, functional efficiency, and esthetic harmony shown in Fig. 5.

This is a qualitative classification and the only kind of classification compatible with infinite variation. The hereditary and environmental factors causing infinite variation are so complex that it must be apparent that no scientific data derived from any statistical compilation could possibly be accurate beyond the group involved and would *not* apply to humanity as a whole. By comparing extremes of variation, which are inescapable in practice, some con-

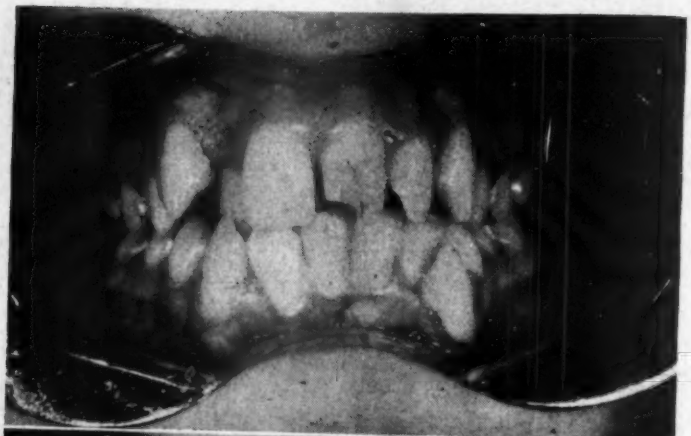

Fig. 2.

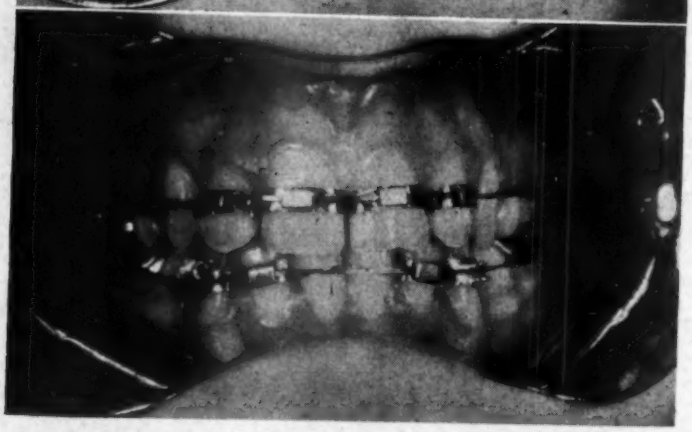

Fig. 3.

Fig. 4.

Fig. 5.

clusions and principles of procedure, which are of universal application, become exceedingly clear.

The question now arises—how are we to make the decisions which these problems provoke? As a prerequisite, it is necessary to have a viewpoint from which to scan each individual case as a composite whole, a big picture concept. This viewpoint must be kept in mind not only as a diagnostic vantage point, but as a strategic observation point during the entire treatment as well. In his articles on myofunctional therapy, Dr. Alfred P. Rogers coined the term, "the position of mechanical advantage." This contains an idea which, in my father's opinion, is the most important *single* idea that was ever presented to orthodontics. It is the *pivital point,* the *basis of diagnosis and treatment,* the *center from which, in our practice, everything radiates.* The first objectives and the types of appliances to be employed are determined by the picture which this shows and nothing else. Far from being indefinite and visionary, this shows in the most concrete, definite, and unmistakable form the exact information we are after, and, in a logical sequence, the most direct steps which are indicated to reach each successive objective. This is so simple that even a beginner can understand it and although it may require some finesse of judgment, at which nobody will ever be perfect, most of the time it requires a little properly applied common sense.

Fig. 6 is a case with a deep overbite which is a common type case involving functional efficiency. In the position of mechanical advantage, as shown in Fig. 7, we can see the changes which must be made. Primarily through the use of labial arches, auxiliary springs, and bite planes, this case finally looked something like Fig. 8, although a Johnson twin wire was used to help align the anterior teeth. Esthetic harmony was reached, completing a satisfactory case.

We are all human, and being human we are all subject to personal preferences. At this time I wish to show you a few of those personal preferences in appliances. Fig. 9 shows a technical model with two simple labial arches. To the maxillary labial arch is attached a large finger spring designed to move the first incisors both labially and gingivally. This is quite a common movement, desired particularly in deep closed bites. There is also shown a smaller finger spring which is designed to move the first premolar buccally. To the lower labial arch are attached finger springs which will move the lower canines both labially and gingivally, if so desired. This gingival movement is often quite useful when canine expansion is desired to make room for four lower incisors. By depressing the lower canines slightly, the smaller part of the canine crowns is in contact with the upper canines which consequently, allows greater canine width without expanding the upper arch. In addition to these finger springs, we also have coiled springs at the distal ends of the lower arch. When the lower labial arch is ligated to the lower incisors, a certain degree of incisal depression and anteroposterior lengthening of the arch can take place. The main efficiency of the appliance shown here lies in the fact that intermaxillary action can take place through the main arch, which may increase the curve of

Spee as this is done, since the arch is ligated to the premolar bands. While this action is taking place, the auxiliary spring can work independently of the main arch and cause anterior and/or gingival movement of the incisors. The main arch does not touch the anterior teeth for these movements. Fig. 10 is a picture of another auxiliary spring used more and more satisfactorily in our practice.

Fig. 6.

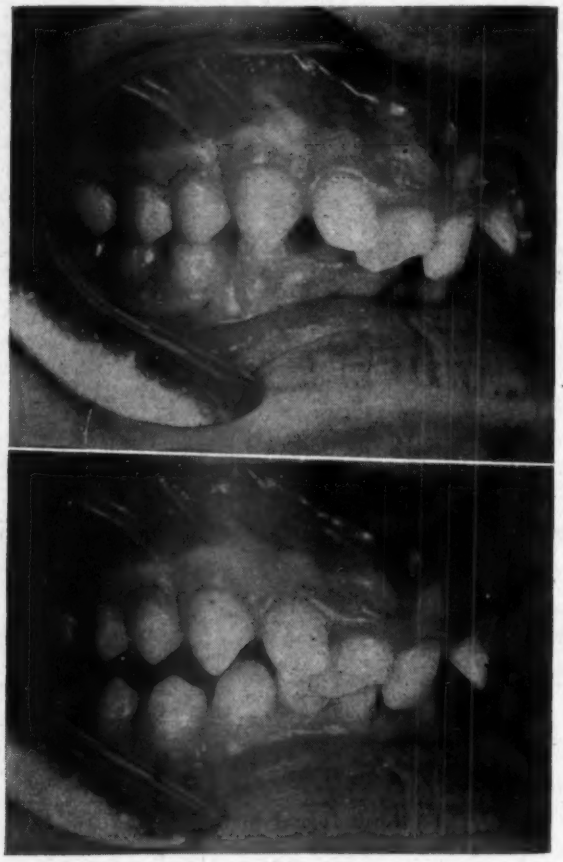

Fig. 7.

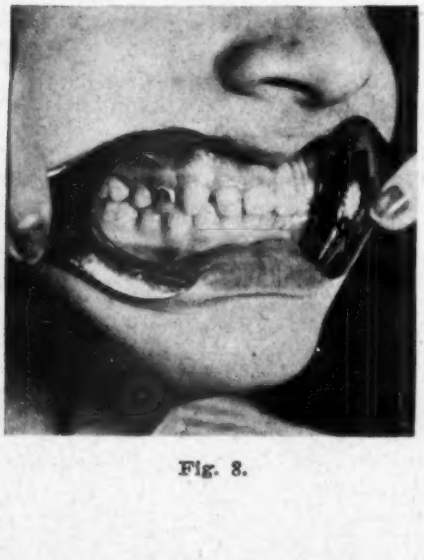

Fig. 8.

For want of a better name, we call this appliance a "double boiler," a nickname which is at once both descriptive and quickly understood in conversation. It is similar in most respects to the spring I have just described, except that it continues to the opposite side, terminating through a small loop attached to the main arch. This loop is like a universal joint in that it allows the spring movement in any direction and also gives a certain amount of stability as a fulcrum. This spring is used to retract anterior teeth since the auxiliary spring can form a smaller arc, thereby causing force to be exerted in a lingual direction. Movement gingivally can also take place with this arch and spring. The lower arch as described offers a very firm anchorage for intermaxillary elastics. In fact, except for very deep overbites, this labial arch is usually the only lower arch used in our practice.

Fig. 9.

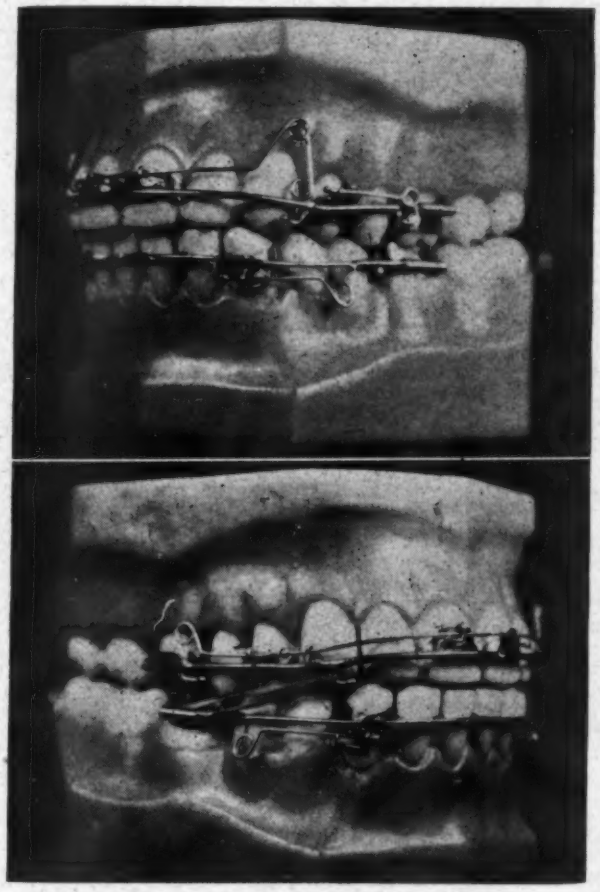

Fig. 10.

With this short explanation of the labial arch in mind, I wish to show you a few pictures of actual problems and how they were met practically, always with the big picture concept in mind.

Fig. 11 shows a peculiar but good place to use a bite plane. It was used here to help jump these incisors. With the aid of a finger spring, while a bite

plane holds the bite open, the incisor teeth are soon "over the fence," so to speak, as shown in Fig. 12. Treatment consists in the removal successively of interferences until the case meets within all practical purposes the three requisites of the original concept of a satisfactory occlusion. As treatment is concerned with *infinite variation* of nature, the greater the *variety of appliances* to meet the problem of the moment, the more efficient should be the treatment.

Fig. 11.

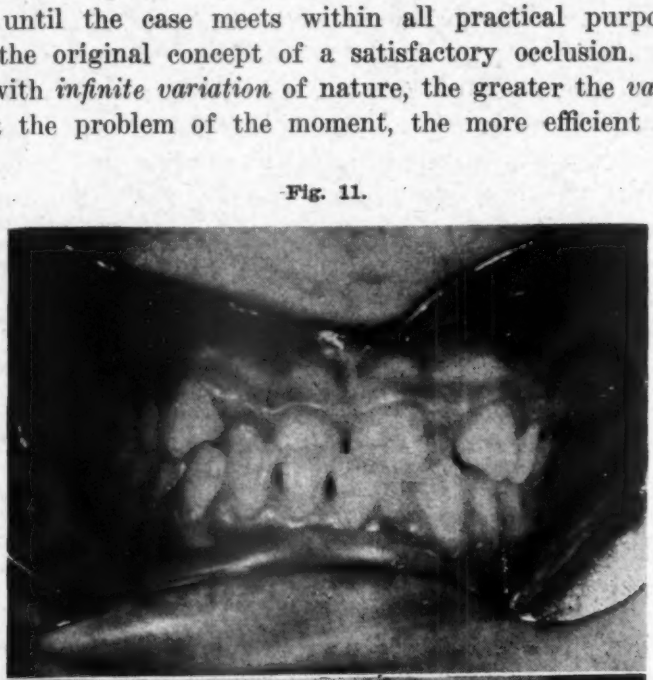

Fig. 12.

The appliances most commonly used by us are the simple labial arch with auxiliary springs of every description, the bite plane which is practically a necessity in cases requiring vertical changes, the removable lingual arch, and lastly the Johnson twin-wire technique used to produce beautiful alignments when reciprocal action between elements can be used so advantageously. The bite plane is found to be most useful because of its tendency to direct natural function which is the most natural way to produce permanent change. From the simple labial or lingual arch with auxiliary springs, alone, many seemingly impossible movements may take place, always with a minimum of teeth banded

for the sake of cleanliness, patient comfort, beauty, and ease of adjustment or change.

Fig. 13 shows a case where we have chosen a crib to help shorten the upper incisors and, at the same time, to assist in making space for two unerupted canines by the use of two recurved springs. These springs move the premolars distally. This action is assisted by the action of intermaxillary elastics. Fig. 14 shows another tooth in a most peculiar position. By the use of a labial arch and an auxiliary finger spring, movement is exerted labially, and eight months later we have a regular finger spring in place on a canine band, to move the tooth to its proper alignment as shown in Fig. 15.

Some appliances are wonderfully adapted to meet the requirements of one case and at the same time are contraindicated in another. No *one* appliance can possibly be completely universal. At each visit of the patient, we study the position of mechanical advantage. From this study, we then choose the best appliance to suit the conditions of the case at *that* moment.

These progress pictures of two cases might be interesting. Fig. 16 is a young lady, 15 years of age. It was noted here that the upper right molars had moved slightly anteriorly from the corresponding position of the left molars. This has produced definite crowding in the premolar and canine areas on the right side. The left side is in good alignment, and the lower jaw has satisfactory structural balance. However, there is an obvious overjet due to the bimaxillary distoclusion. This gives a definite and objectionable protruded effect to an otherwise fair esthetic balance. It was decided to compromise in this case by removing the upper right first premolar to compensate for the anterior movement of the right molars and the overjet of the maxillary anterior teeth. As the lower jaw was brought forward with intermaxillary elastics, the upper anterior teeth were moved lingually by an auxiliary spring on a plain labial arch as shown in Fig. 17. The lower canines were broadened by finger springs on a lower labial arch. Sufficient space was made lingually for the upper anterior teeth by moving the right canine posteriorly by the use of an elastic on the lingual side of the molar to the canine. A Johnson twin wire was then substituted to align properly the anterior teeth. The distoclusion on the left side was corrected while the right side remained in distoclusion as a compromise measure. Except for a slight vertical change necessary in the upper right canine region, as shown in Fig. 18, the case is almost completed and is satisfactory as far as structural balance, functional efficiency, and esthetic harmony are concerned. The length of time for this treatment has been but seven months.

Fig. 19 is a case of a young lady who is 25 years of age. This case has been mutilated. It is definitely closed on the left side and is in distoclusion while in cross-bite on the right side. In the position of occlusal advantage, we can see the lack of vertical development on the left side and the swing of the jaw to the right that is needed to align the median line of the jaws and the face as seen in Fig. 20. The vertical dimension was changed by the use of up and down elastics in conjunction with an occlusal bite plane to lower the lower

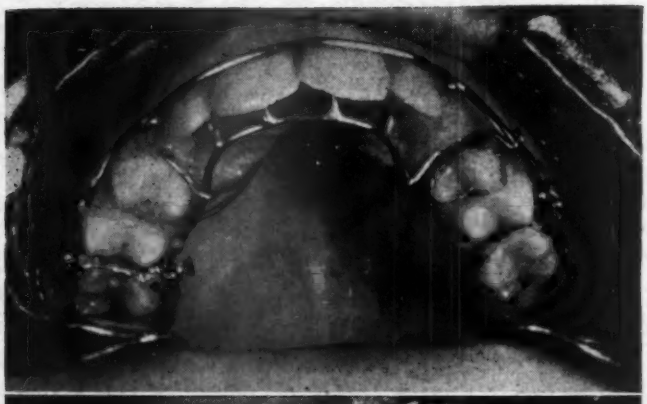

Fig. 13.

Fig. 14.

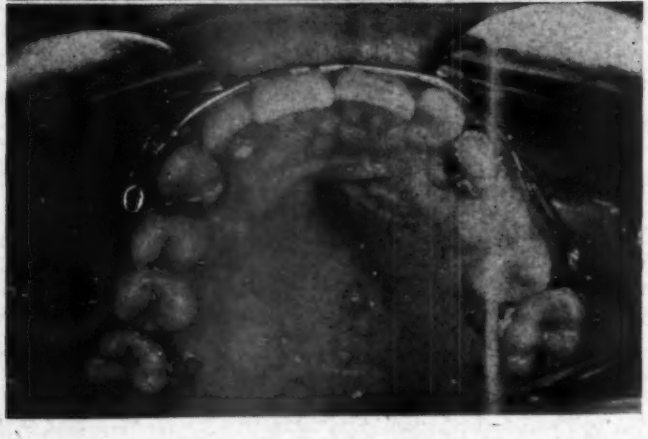

Fig. 15.

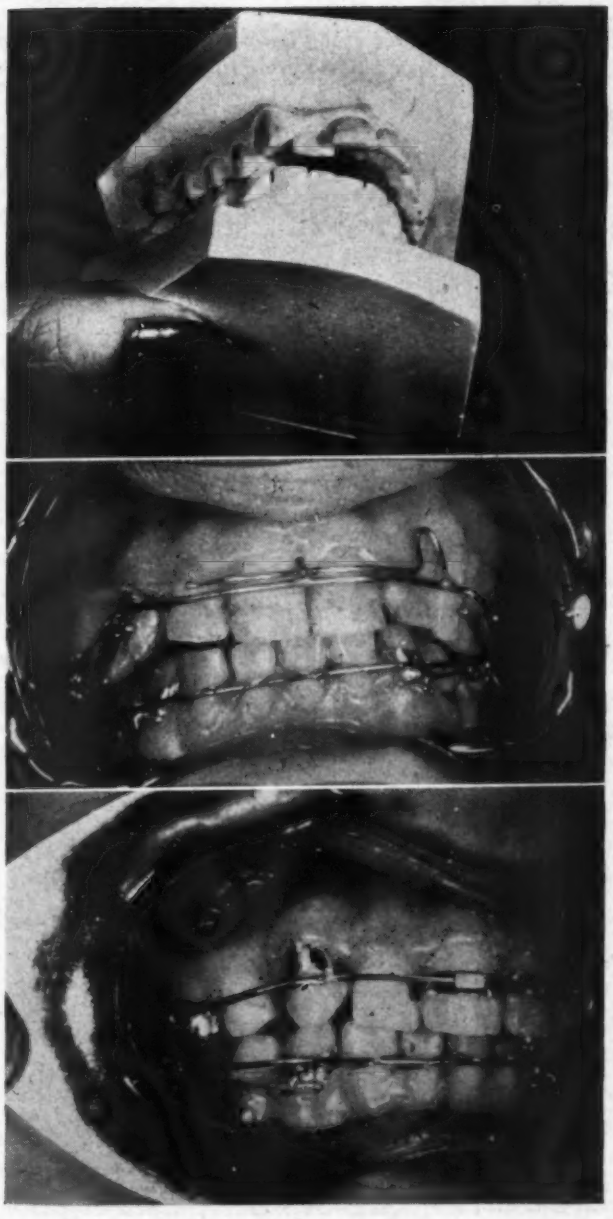

Fig. 16.

Fig. 17.

Fig. 18

anterior teeth which allowed room to retract the upper anterior teeth. This was done by an auxiliary spring on an upper labial arch. At the same time, the cross-bite and lateral movement of the jaw was altered by the use of in and out elastics as shown in Fig. 21. In Fig. 22 we see the relationship of the jaws with the plate and elastics in place. In this figure we see the new vertical as well as anteroposterior relationship maintained with an occlusal bite plane and elastics. Simple labial arches and finger springs were used exclusively. This case to date has been under treatment about nine months.

Fig. 19.

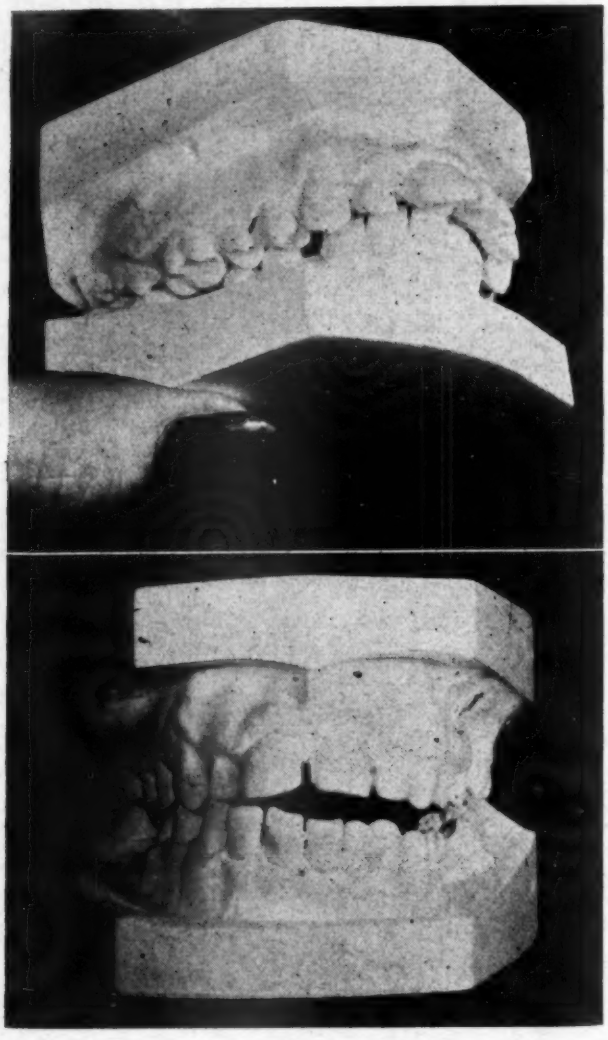

Fig. 20.

My conclusions are that I agree with Dr. Brash that there is no direct relation between the size of the teeth and the size of their supporting structures. I agree that this is predominantly a genetic problem which cannot be altered by natural means, that, therefore, an orthodontist is justified in extracting any

teeth which will improve the structural balance, functional efficiency, and esthetic harmony of an individual, and that judgment for these decisions lies entirely with his artistic sense and mechanical ingenuity. I believe that bite planes are most useful in aiding vertical changes and quite necessary to develop proper function. I prefer to use as few bands as possible, as I believe natural

Fig. 21.

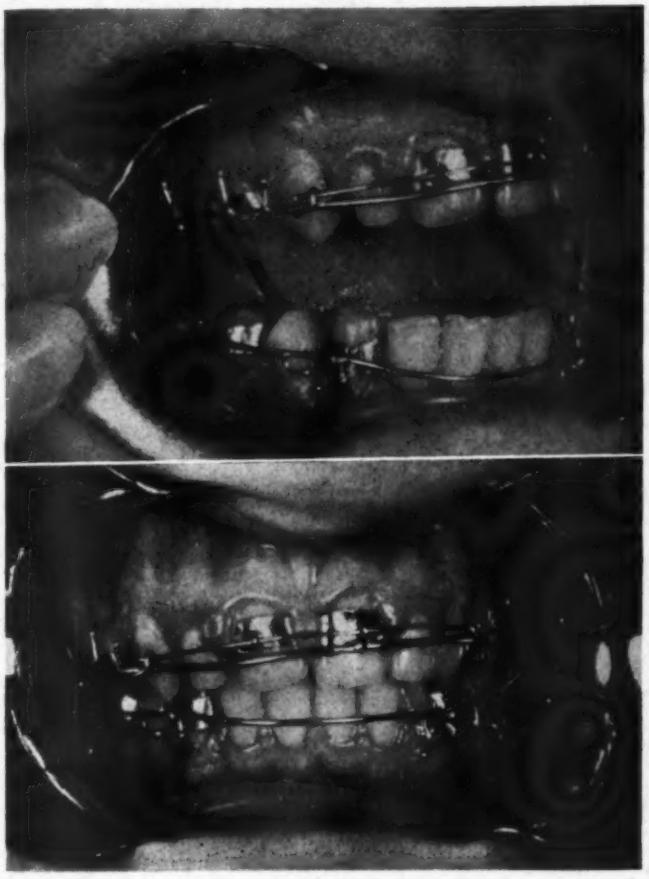

Fig. 22.

function should play a bigger part than mechanical forces in orthodontic treatment. And, above all, I believe that a proper understanding of the position of occlusal advantage is essential, in conjunction with a versatile selection of appliances to meet various problems, in order to practice orthodontics efficiently.

Medical Arts Building

Department of Orthodontic Abstracts and Reviews

Edited by

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All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. J. A. Salzmann, 654 Madison Avenue, New York City

Practical Pedodontia: By Floyde Eddy Hogeboom, D.D.S., F.A.C.D., Professor of Children's Dentistry, College of Dentistry, University of Southern California, former member, Health Development Department, Pasadena City Schools; former member of Children's Hospital staff, Los Angeles; Chairman, Dental Assistant's Course, Los Angeles Junior College, Los Angeles, 1930-37. An introductory text for students and practitioners of dentistry, covering juvenile operative dentistry and public health dentistry. Special chapters by Forrest Anderson, M.D., ScD.(Med.), Director, Child Guidance Clinic of Los Angeles and Pasadena; Lecturer in Mental Hygiene, University of California, and College of Dentistry, University of Southern California. Harold Hawkins, D.D.S., former Associate Professor of Bacteriology and Preventive Dentistry, College of Dentistry, University of Southern California. Thaddeus P. Hyatt, D.D.S., F.A.C.D., former Professor of Preventive Dentistry, New York University, College of Dentistry; former Director, Dental Department, Metropolitan Life Insurance Company. Harry E. Straub, D.D.S., Special Instructor in Exodontia and Minor Surgery, former faculty member, College of Dentistry, University of Southern California. Fifth edition, St. Louis, The C. V. Mosby Company, 1946.

For almost a quarter of a century the name Hogeboom has been intimately identified with children's dentistry. Throughout the years, the author has continued to advance in the cause of dentistry for children. In the present edition, several new chapters have been added. The economics of children's dentistry are presented in a separate chapter. Here it is intended to show how the dentist can be compensated for his work and how the cost per hour of service can be determined. Cavity preparation is discussed and illustrated in detail as is filling material especially adopted in use in deciduous teeth. Techniques are provided for treatment of involved pulps. At the same time, the various aspects of dentistry are given in detail. Treatment of structure of incisor teeth in children is given some length and the operative procedures are fully illustrated.

The book is well illustrated and will be found of practical value by the dental practitioner.

Three-Quarter Crowns, How to Construct and Apply Them: By F. Engel, L.D.S., R.C.S., Eng., Univ. Med., Dr. Vienna Bournemouth, England. Translated and revised from the German text. With 182 figures in the text and 3 plates. Pp. 142. Price $4.50. Dental Items of Interest Publishing Company, Inc., Brooklyn, N. Y., Henry Kimpton, London, 1946.

This is an English translation of a book originally published in German in Vienna in 1933. Revisions of the text were made to take care of new develop-

ments in the field. Fundamental steps are given on the preparation of teeth for the construction of three-quarter crowns. This chapter is well illustrated, showing not only the teeth and various stages of preparation, but also the method of applying grinding stones and other instruments to the teeth.

The author advocates indirect-direct methods as the most suitable for making wax patterns of a three-quarter crown. It is recognized that elastic material now available permits making stone models of high accuracy. Pre-shaping of wax patterns on stone models obtained by casting hydrocolloid impressions is advised. On the other hand, in cases where the crown reaches under the gum margins, hydrocolloid will not afford a clear-cut impression.

Although little is said on the subject of casting, a great deal of space is devoted to analysis of the mechanical factors governing the possibility of bringing a bridge or splint of two or more than two three-quarter crowns into position on the teeth. Methods of using the disk parallelometer are presented. On the question of soldering, a precision method is discussed for soldering complete contact of surfaces by means of furrow inlays. Interesting chapters are presented on the indications as well as on the limits of the use of the three-quarter crowns. The book is unusually well illustrated throughout and should prove of great practical value to the dentist.

Cleft Palate and Speech: By Muriel E. Morley, B.Sc., F.C.S.T., Speech Therapist to the Royal Victoria Infirmary, The Hospital for Sick Children, and the Newcastle General Hospital, Newcastle-Upon-Tyne. A William Wood Book. Pp. 160. Price, $2.75. Baltimore, Williams & Wilkins Company, 1945.

In this book, Miss Morley presents the benefits for harelip and cleft palate patients and of the association between the surgeon and speech therapist. Chapters are included on the development of face and mouth, explaining the occurrence of congenital clefts of the lip and palate. The principal methods of cleft palate operation are discussed as well as the means adopted to improve speech. Twenty-three case histories are quoted to demonstrate special points which may arise in connection with treatment.

A chapter is presented on the normal palate and an outline is given on the development of cleft palate surgery. Typical defects in cleft palate are discussed and the conditions which influence the prognosis are presented. Speech defects remaining after the Langenbeck operation are ascribed to a soft palate which is too short and to rigidity of a soft palate due to contraction of scarred tissue. Various types of obturators are discussed. With regard to the development of position in the child with cleft palate it is pointed out that the deficiency lies in the apparatus for normal articulation since the child is unable to divide completely the oral from the nasal cavities resulting in nasalized sounds.

With regard to the best stage for operative treatment, early operation before defective habits become established is advised. Methods and testing for nasal escaping air are given. The bibliography on speech is appended.

Temporomandibular Arthrography: By Flemming Nørgaard. Price, Dan. Kr. 24.—Pp. 216. Einar Munksgaard, Nörregade 6, Copenhagen.

In an absorbing and enlightening monograph, translated from the Danish by Dr. Hans Anderson, Dr. Flemming Nørgaard has presented the findings of an investigation on the temporomandibular joint that has been probed roentgenographically. This project is of more than passing interest because it reports the work of x-ray examinations of the joint by means of a contrast medium called perabrodil. This is a 35 per cent aqueous iodine-containing solution that has the

property of fairly rapid absorption and of extremely low toxicity. The resulting picture is called an arthrogram.

This method is of especial interest to practitioners interested in the temporomandibular joint and its disorders, since it gives a valuable insight to deranged joints and indicates which areas and structures are particularly affected. This is accomplished by injecting the contrast medium separately into each synovial chamber and recording roentgenographically the outlines and spatial accommodations of the cavity. When the second chamber is thus similarly treated, an intervening radiolucent space indicates the meniscus and the extent of its involvement. This is particularly illuminating in cases of limited, painful, and restricted opening of the jaws.

In a carefully prepared introduction, the author considers the normal anatomy of the joint and the various roentgenologic techniques of the joint without contrast media. In the report of his investigations, he describes the technique of arthrography, its inconveniences to the patient, and ensuing complications which are described as negligible and transitory.

Employing the temporomandibular arthrogram as a means of estimating the pathologic picture requires a knowledge of anatomy, physiology, and pathology. Even after checking the results of some of his contrast medium injections by means of surgical explorations, there were some cases that proved difficult of interpretation.

This reviewer believes it might have proved more enlightening if the cases were examined stereoscopically and not by the inadequate flat plane technique. This deficiency is referred to several times in the text by an interesting schematic presentation of how the areas under discussion might be considered in different planes and projections. The author dismisses tomography as a considered technique on the grounds that it is lacking considerably in the sharpness of the contours as well as the structures and since it does not furnish essential information that cannot be obtained with one of the ordinary profile roentgenograms.

Dr. Nørgaard prefers the oblique-lateral transcranial roentgenography that almost corresponds to Schuller's projection for examination of the inner ear which is about twenty-five degrees obliquely caudally across the head. But many of his perplexities might have been resolved if he viewed his pictures in three-plane projection.

In a similar project presently under investigation at a New York Hospital, a contrast medium called Diadrast (Winthrop) has proved equally satisfactory and is the American equivalent of the European perabrodil. However, when viewed stereoscopically, the medial aspects of the joint are clearly discernible and the disturbing superimpositions of the flat plane projection are dissipated. This has led to a dubious interpretation on page 41, where Dr. Nørgaard evaluates the importance of lateral shifting of the condyle within the glenoid fossa as having to be looked upon as very slight. In our investigation of the problem, we have found this to be the essence of temporomandibular joint disturbances since the anatomy of the joint is prepared to accept reactions mediolaterally more than anteroposteriorly.

One of the most significant findings of the investigations that was graphically demonstrated in the arthrogram (joint picture), through the agency of the contrast medium, was adhesions between the joint surfaces. This also involved a displaced meniscus and indicated to which surface it was adherent. It offered valuable information about the localization of the lesion of the joint, also something of its character and to what degree the changes presented. It is on this basis that Dr. Nørgaard appeals its employment as a valuable supplement to the routine examination of patients presenting with temporomandibular symptoms.

It is contraindicated, however, in all forms of infectious arthritis and in all inflammatory processes in tissues surrounding the joint. It is, seemingly, also contraindicated in very young patients.

Dr. Nørgaard spends considerable time explaining the difficulties in recognizing the meanings of different densities in the single plane or flat reproduction. Much, if not all, of these confusions are dissipated when viewed stereoscopically in three dimensions, and it is to be regretted that this valuable aid was not utilized in the investigation.

Contrary to some prevailing opinions, he demonstrates the certain possibility of perforation of the meniscus as a result of abuse and insult suffered from aberrations in occlusion. In fact, it is claimed to be the one abnormality most easily recognized. This was verified frequently by operation and surgical inspection. The material examined originally was 113 cases, later extended to 125, of which 96 cases are current with age averages of about 31 years.

While this project was essentially conducted to establish a method of investigation of temporomandibular arthrosis for diagnosis, the fairly complete history in 113 case reports in many instances mentions treatment. The amazing thing is that this, in a high percentage of cases, was merely the application of diathermy and in very few cases was there recommendation of grinding the teeth in balanced occlusion.

Since this is the basic etiologic factor in developing a joint arthrosis, why wasn't more attention paid to this important therapy? About one quarter (25 out of 96) were treated operatively, which seems like an inordinately high percentage for such a drastic procedure, although it certainly afforded a valuable clinical check for the arthrogram which he found in good concordance.

Dr. Nørgaard is to be congratulated in this valuable and enlightening investigation, and for the frank and complete manner in which he reported his work. Students and practitioners interested in this problem would find it very profitable and absorbing to read it and acquaint themselves with this novel technique.

Sidney E. Riesner.

The Relationship of Dental Malocclusion to Vacuum-Otitis Media and the Use of Dental Splints During Descent From Altitudes: By Howard R. Bierman, Commander, Medical Corps, United States Naval Reserve, Bethesda, Maryland, and I. William Brickman, Lieutenant, Dental Corps, United States Naval Reserve, Pensacola, Florida, Ann. Otol., Rhin. & Laryng. **55**: 5-12, March, 1946.

During World War II, observations in the low pressure chambers at the Naval Air Station, Pensacola, Florida, showed that from 10 to 15 per cent of more than 15,000 men developed ear block during recompression. Ear block may be defined as discomfort in or about the ear of sufficient degree during recompression to require halting any further increase of pressure.

A survey of the most common methods used for ventilating the middle ear was made among 873 cadets undergoing "flights" in the chamber. The occurrence of ear pain during descent was correlated with the method used. Thirty-four per cent of the group used a modified Valsalva method, 33 per cent used the swallowing mechanism, and 13 per cent used movement of the mandible. The remaining 9.9 per cent used combinations of these. Ear block occurred least frequently when movement of the mandible was used.

The finding that movement of the mandible was the most effective means of ventilating the middle ear led to an investigation of the anatomic positioning of the mandible. The state of dental occlusion in 821 subjects was determined prior to a flight in the chamber and correlated with the ear difficulty encountered during descent.

Ear block during low pressure chamber descents was found to occur about five times as frequently in individuals with malocclusion as in individuals with normal occlusion.

Another group of 439 aviation cadets and student officers were examined otoscopically shortly after their "flights" in the chamber.

Only 12 per cent of those individuals with normal occlusion exhibited otoscopic changes sufficient to warrant the diagnosis of an acute aero-otitis media. The remaining 88 per cent showed some scattered, vascular injection of the tympanic membrane usually with retraction, but without abnormal otoscopic findings.

Conversely, a full-blown picture of acute aero-otitis media was frequently discovered by inspection, but upon questioning no history of ear pain could be elicited. This situation occurred equally in cases of normal occlusion or malocclusion.

The fact that ear block occurs more frequently in individuals with faulty occlusion than in persons with normal occlusion suggested that repositioning the mandible might have a beneficial effect in those individuals with malocclusion. This was supported by the finding that voluntary repositioning of the jaw (yawning) proved to be the most effective method in middle ear ventilation on descents.

Horseshoe-shaped dental splints were made of acrylic resins. The intermaxillary distance was increased 8 mm. along the biting surfaces and the width was 12 mm. The splint was retained in the mouth during the entire period of descent. The rate of descent was approximately 5,000 feet per minute. The splints were inserted at 30,000 feet.

The incidence of ear block occurring on descents during which every man used a dental splint is 5.2 per cent of those individuals with normal occlusion and 9.1 per cent of those with malocclusion. The dental splints significantly reduced the incidence of ear block only in individuals with malocclusion.

DISCUSSION

Manipulation of prepared sections cut through the auditory orifice and the mandibular condyle show that, on closure of the bite, the wrinkling of the external pterygoid muscle is sufficient to compress the membranous part of the auditory tube. (Sections prepared by Dr. J. B. Costen of St. Louis, Missouri.) Overclosure or malposition of the jaw enhances this compression and also shortens the span of the tensor veli palatini muscle. This loss of span of the tensor veli palatini muscle from its origin at the membranous part of the auditory tube to its insertion in the soft palate impairs the efficiency of this muscle in opening the auditory tube during swallowing. Thus, in malposition of the jaw, there is not only compression of the auditory tube by the external pterygoid, but the usual efficiency of the mechanism of opening the tube by swallowing is impaired.

The simplest method for ventilating the middle ear is swallowing. In certain individuals, however, swallowing is ineffective and the individual requires the aid of other maneuvers or a combination of maneuvers to obtain satisfactory middle ear ventilation. Excessive mandibular movement, on the other hand, although most effective, changes the normal contour of the face, thus altering the fit of an oxygen mask and increasing the opportunity for leakage of atmospheric air. An attempt to combine deglutition with a simultaneous downward and forward movement of the jaw has proved a difficult maneuver to learn for mass instruction.

Ventilation of the middle ear for passengers can be readily and safely obtained without the modified Valsalva maneuver. Merely swallowing with the nares held closed is sufficient to allow air to pass into the middle ear.

The use of dental splints in cases of malocclusion with the normal complement of teeth to reposition the mandible proved the effectiveness of such an appliance in ventilating the middle ear. The effectiveness of the dental appliance appears to be mainly in increasing the intermaxillary distance. The increase in salivation caused by the splint stimulates swallowing which undoubtedly assists in the ventilation of the middle ear.

The splint permitted self-retention, avoided interference with articulation, and maintained its effectiveness. This device also has been developed to fit all types of occlusion and is suitable for passenger use in transport aircraft.

CONCLUSION

Movement of the mandible is the most effective method of maintaining ventilation of the middle ear on descent in the low pressure chamber. Ear block on descent in the low pressure chamber occurs about three to five times more frequently in individuals with malocclusion than in those with normal occlusion. The use of dental splints on descents in the low pressure chamber materially aided ventilation of the middle ear in individuals with malocclusion.

News and Notes

American Association of Orthodontists

The next meeting of the American Association of Orthodontists will be held at the Neil House, Columbus, Ohio, April 27, 28, and 29, 1948. Members of the American Dental Association are invited to attend this meeting. Proper credentials should be obtained in advance from the secretary of the American Association of Orthodontists, Dr. Max E. Ernst, 1250 Lowry Medical Arts Building, St. Paul 2, Minnesota, or from the secretary of a constituent society.

Great Lakes Society of Orthodontists

The eighteenth annual meeting of the Great Lakes Society of Orthodontists will be held Oct. 27 and 28, 1947, at the Royal York Hotel, Toronto, Canada.

The two-day meeting will feature the following essayists:

Dr. Wendell Wylie, San Francisco, California.

Dr. W. B. Downs, Chicago, Illinois.

Dr. Andrew Jackson, Philadelphia, Pennsylvania.

Northeastern Society of Orthodontists

The next meeting of the Northeastern Society of Orthodontists (formerly New York Society of Orthodontists) will be held at the Waldorf-Astoria Hotel, New York, on Monday and Tuesday, Nov. 10 and 11, 1947.

Seminar for the Study and Practice of Dental Medicine

The fourth annual seminar for the study and practice of dental medicine will be held at the Ahwahnee Hotel in Josemite, California, on Oct. 19 to 24, 1947.

Oliver Labiolingual Postgraduate Course for Orthodontists

The first Oliver labiolingual postgraduate course for orthodontists was held at Washington University School of Dentistry for two weeks, June 2 to June 14, 1947 inclusive.

The course was attended by twenty orthodontists from eight states and Colombia, South America.

The schedule included lectures and laboratory technical instruction, with attendant and related dental and medical dissertations.

All orthodontic instruction was under the direction of Dr. Oren A. Oliver, Nashville, Tennessee, assisted by Dr. Russell E. Irish, Pittsburgh, Pennsylvania, and Dr. Boyd W. Tarpley, Birmingham, Alabama.

Special lectures were given as follows:

"Endocrinology." Palmer H. Futcher, M.D., Washington University School of Medicine.

"Relationship of the Nose and Throat to the Oral Cavity." G. O'Neal Proud, M.D., Washington University School of Medicine.

"Radiodontics." C. O. Simpson, M.D., D.D.S., Professor of Radiodontics, Washington University School of Dentistry.

"Genetics." Florence M. Heys, Ph.D., Instructor in Pediatrics, Washington University School of Medicine.

"Growth and Development." R. J. Blattner, M.D., Assistant Professor of Pediatrics, Washington University School of Medicine.

"Anatomy of the Head and Neck." Leroy R. Boling, Ph.D., Professor of Anatomy, Washington University School of Dentistry.

"Ear Syndromes and Temporomandibular Relations." James B. Costen, M.D., Assistant Professor of Clinical Otolaryngology, Washington University School of Medicine.

"Cleft Palate Problems." J. Barrett Brown, M.D., Professor of Maxillofacial Surgery, Washington University School of Dentistry.

"Dentistry for Children and Preventive Orthodontics." Ruth Martin, D.D.S., Professor of Dental Pediatrics, Washington University School of Dentistry.

"Oral Pathology." Barnet M. Levy, D.D.S., Associate Professor of Pathology, Washington University School of Dentistry.

"The Third Molar." R. B. Rode, D.D.S., Professor of Clinical Oral Surgery, Washington University School of Dentistry.

"Surgical Correction of Mandibular Prognathism." L. W. Peterson, D.D.S., Associate Professor of Oral Surgery, Washington University School of Dentistry.

As evidenced by the foregoing curriculum, the time was exceedingly well occupied both from a theoretical and a practical aspect. Several members of the class, upon completion of the course, immediately made plans to attend the next year's course tentatively set for January, 1948.

Pacific Coast Society of Orthodontists

The following part of the program of the meeting of the Pacific Coast Society of Orthodontists, Feb. 24, 25, and 26, 1947, was omitted through an oversight.

On Tuesday afternoon, a very interesting and instructive symposium on appliances was given. Dr. Frank P. Boyer handled the labiolingual type in a most learned and scientific manner. His pleasing southern diction made the subject matter easy to take. With slides and excellent photography, the ideals and fundamental principles of Mershon plus later additions and improvements by Oliver, Wood, and Irish, the labiolingual appliance was well presented.

The edgewise mechanism next came in for a thorough discussion. Dr. Matt Lasher introduced Cecil C. Steiner as the oldest and foremost user of the appliance.

Dr. Steiner gave the history of the evolution of the mechanism, and then proceeded with the technique, uses, and advantages. He laid special stress upon its stability, flexibility, and elasticity. Stationary anchorage and bodily movement of teeth came in for much emphasis. Stress was laid upon the fact that the appliance must be mastered before ideal results can be obtained. Various other aspects of the mechanism were presented by means of slides and motion picture.

The time to have been taken by Dr. Spencer Atkinson on the universal appliance was given to Dr. Sved; however, the appliance came in for thorough discussion in the last paper of the meeting by Dr. Stinson Dillon.

One of the interesting highlights of the meeting was the paper read by Dr. Sved of New York. His engineering background and his basic knowledge of orthodontics give him the right to delve into and report to the Society on the advisability of the extraction of four premolars as advised by Dr. Tweed.

After going deeply into the reasons for extracting by Tweed and Margolis, he came to the definite conclusion that, in most cases of mandibular protrusion, all mandibular teeth should be moved distally, and proposed the method and appliance being used in his practice for accomplishing the desired result. A set of slides showing the headgear and wire-acrylic mechanism, as well as the results obtained, made his contribution an outstanding one at our meeting.

As in all symposiums, the final question as to the most desirable appliance to be used in the practice of orthodontics was up to the individual.

Tuesday evening session was taken up by technical demonstrations on the appliances. Tarpley and Bowyer showed one hundred models of the labiolingual appliance along with a demonstration of the guide plane.

The edgewise group, consisting of Matt Lasher, George Chuck, C. C. Steiner, Howard Lang, and Betty Selmer, demonstrated the placement of bands, bending ideal arches, and methods of retention. Other features such as supervision of cases and showing results obtained were under the care of Betty Selmer.

The "skullduggery" clinic was presided over by Spencer Atkinson. With his new $35,000 laboratory, thousands of skulls, both animal and human, adequate equipment, and a desire to know and understand the basic principles of tooth movement, Spencer has gone far as an orthodontic research man. With his display of dissected skulls, mandibular and maxillary sections, countless tooth sections to view and study, his clinic was an outstanding part of the program.

Northwestern University Merit Award

Dr. Charles R. Baker, Orthodontist, of Evanston, Illinois, has been awarded a Merit Award from Northwestern University.

In the language of its citation, it is awarded "In recognition of worthy achievement which has reflected credit upon Northwestern University and each of her Alumni."

CHARLES R. BAKER

Denver Summer Seminar

The tenth Denver Summer Seminar for advanced study of orthodontics will be held at the Park Lane Hotel in Denver, Colorado, Aug. 11 to 16, 1947.

Dental Caries—Comparison of Incidence in Italy and United States

Italian children whose wartime diets contained only a negligible amount of refined sugar have from two to seven times less dental decay than American children of similar age groupings, the *Journal of the American Dental Association* reported today.

In the July 1 issue of the *Journal of the American Dental Association*, two University of Illinois dental scientists, Drs. Isaac Schour and Maury Massler, reported on dental examinations of 3,905 persons in four Italian cities following the war.

Among children 13 to 15 years of age in Italy, investigators found an average of only 0.9 of one tooth showing evidence of caries (decay). For the same age grouping in the United States, investigators reported an average of 5.6 teeth with caries experience for children residing at Hagerstown, Maryland, and an average of 8.06 for New Jersey children.

More than half, 53.4 per cent, of Italian children 11 to 15 years of age were found to have caries-free teeth, a condition found in only one out of ten United States children of the same age.

An even greater ratio was reported for the age group of 16 to 20 years. In this group, a total of 38.4 per cent of the Italian residents were found to have caries-free teeth while in the United States, the average is only 1.7 per cent, or less than one person out of fifty.

The findings were made by the Italian Medical Nutrition Mission consisting of a team of medical and dental investigators sent from the United States to assess the effects of malnutrition on the Italian people. Naples was the center of operations. For the most part, the Italian people were found to be malnourished.

Drs. Schour and Massler reported that the Italian diet consisted predominantly of carbohydrates such as spaghetti, macaroni, and bread. They pointed out, however, that only a small amount of refined carbohydrates was included, adding:

"This fact may be the decisive factor in explaining the low incidence of (dental) caries. Our findings thus seem to confirm the contention . . . that many people may eat freely of starchy foods and yet remain relatively free from caries, provided the intake of refined sugar is low."

Commenting on the lack of dental caries in older groups, the dental scientists said that prior to the war, in 1930-34, the per capita consumption of sugar per year was eighteen pounds in Italy as compared with 103 pounds in the United States.

Notes of Interest

The opening of a new clinic providing orthodontic care for those in low income brackets has been announced by the Philadelphia Mouth Hygiene Association, Lieutenant Colonel William C. Webb, Administrator.

Robert E. Hennessy, D.D.S., announces the removal of his office to 312 Humboldt Building, Grand and Washington, St. Louis 3, Missouri, practice limited to orthodontics.

Dr. J. W. Norris announces the association of Dr. Richard H. Bowlin in the exclusive practice of orthodontics at 506-508 Medical Arts Building, Burlington, Iowa.

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The AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY is the official publication of the American Association of Orthodontists and the following component societies. The editorial board of the AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY is composed of a representative of each one of the component societies of the American Association of Orthodontists.

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In the January issue each year, the AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY will publish a list of all of the orthodontic societies in the world of which it has any record. In addition to this, it will publish the names and addresses of the officers of such societies.